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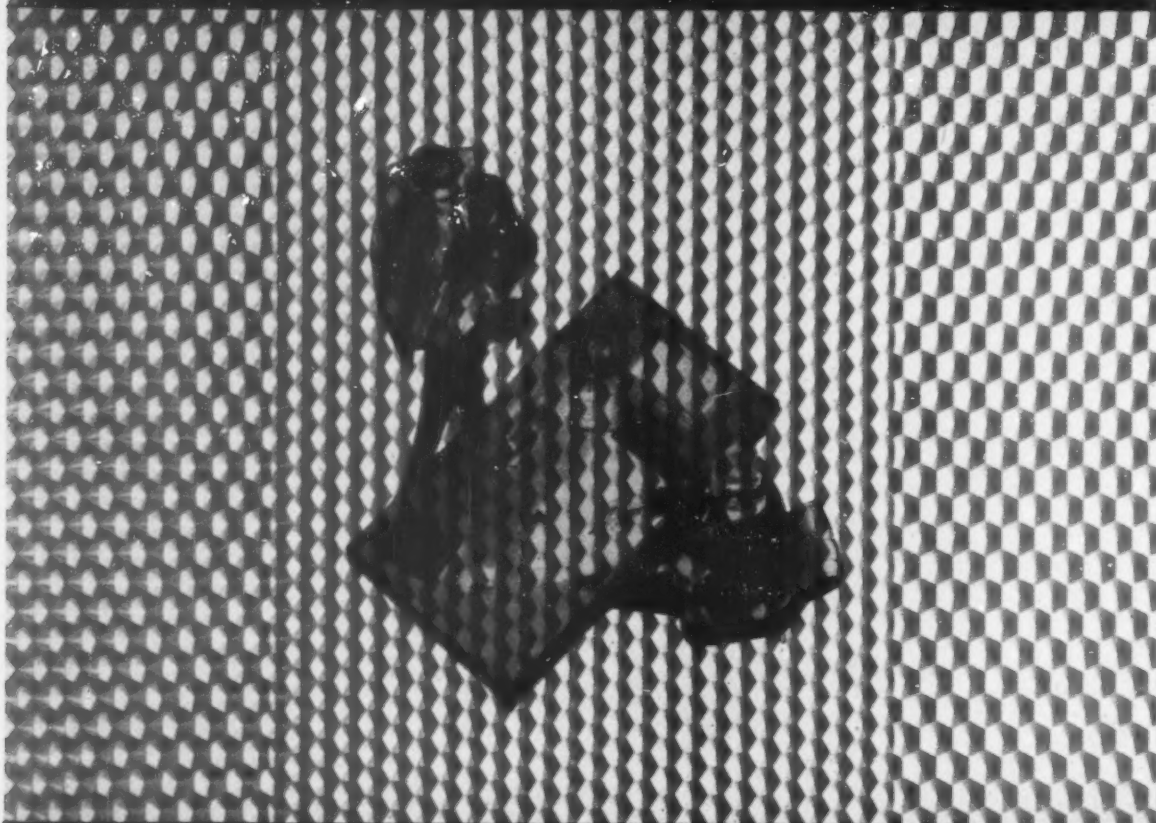
Light and ***Lighting***

January 1961



Lighting has been integrated with the architecture of this factory such that it gives a distribution similar to that of the natural lighting. It is one of the developments referred to in the review of 1960 starting on page 5.

## IF FLUORESCENT TUBES COULD ONLY SEE . . .



they might find themselves peering down through this while their progeny, the little lumens, become white with heat. For confinement to precise lines of conduct is enough to make any lumen glow. Holophane, through their scientific systems of prismatic control, bring to fluorescent lighting a unique approach, where brightness is controlled and high utilization of light sources is achieved. Light is where you want it—on the working plane—and not in the eyes. Write for latest Holophane lighting catalogues, without obligation.

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**G.E.C.**  
LIGHTING DIVISION



# REVO

lighting goes to the front



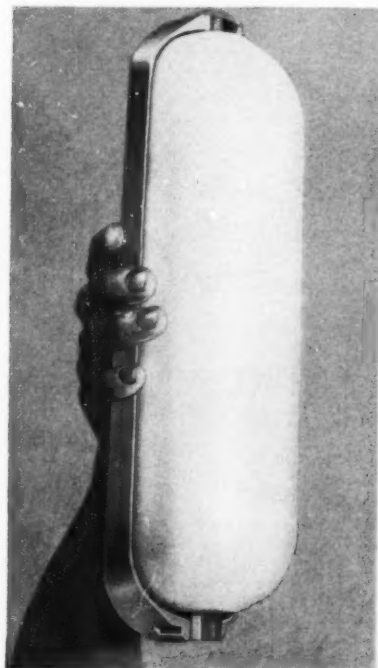
The impressive two mile long sweep of Douglas, Isle of Man promenade is shown here brilliantly illuminated by Revo Helion lanterns (shown top left) specially developed for this scheme.

*Photo by kind permission of C. Anderson, M.I.E.E., M.Inst.F., Borough Electrical Engineer and Manager, Douglas Corporation Electrical Dept.*

Lighting the promenade of a seaside resort involves a number of problems not usually encountered in normal street lighting. The road surface must be exceptionally well illuminated especially during the holiday period. True colour representation is most important. A bright spectacle must be provided without detracting from the effect of other purely decorative lighting. The lanterns must be decorative both when lighted and during daylight and must withstand the effects of storms and sea spray. During the winter provision for the reduction of the lighting to normal standards must be made. All these conditions have been satisfied by the Revo installation at Douglas and has received widespread approval from residents and visitors.

**REVO ELECTRIC CO. LTD.,  
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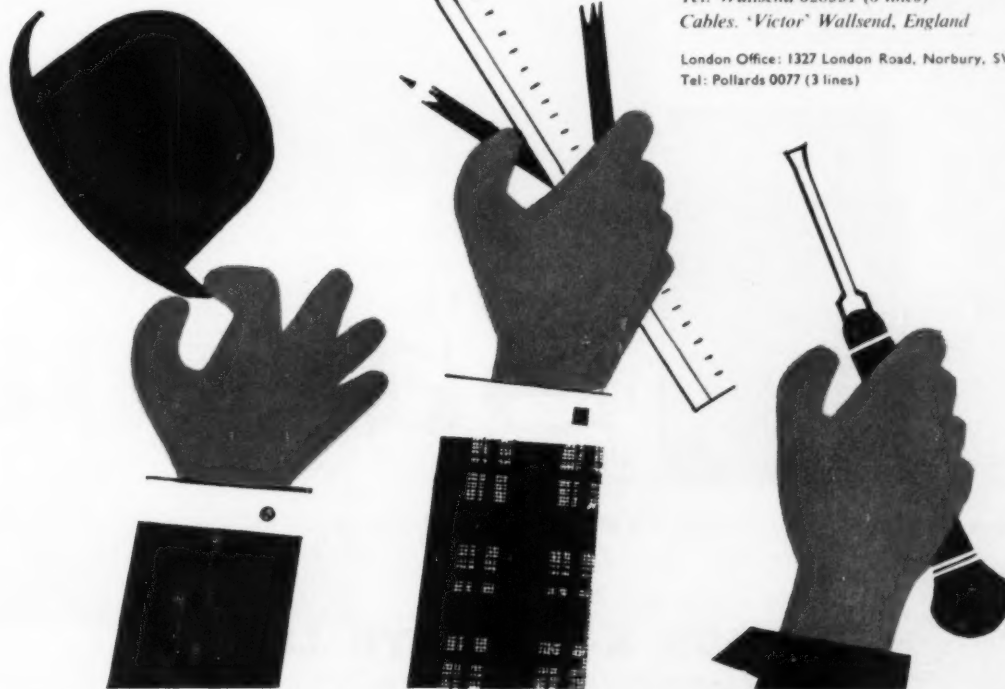
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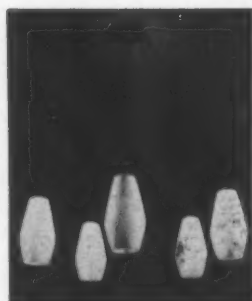
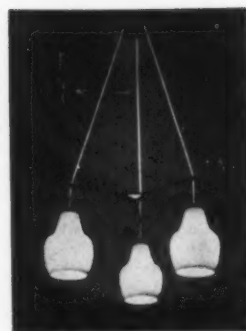
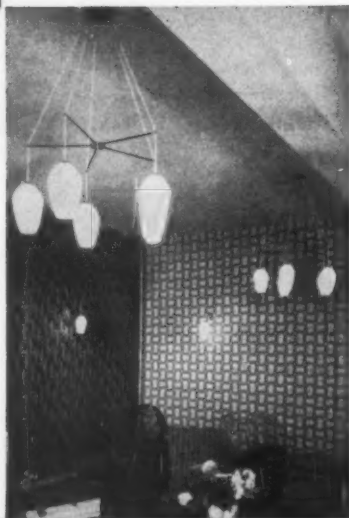
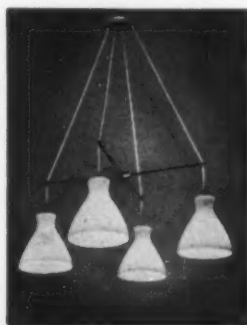
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*A typical selection of*

# Satina

*fittings*

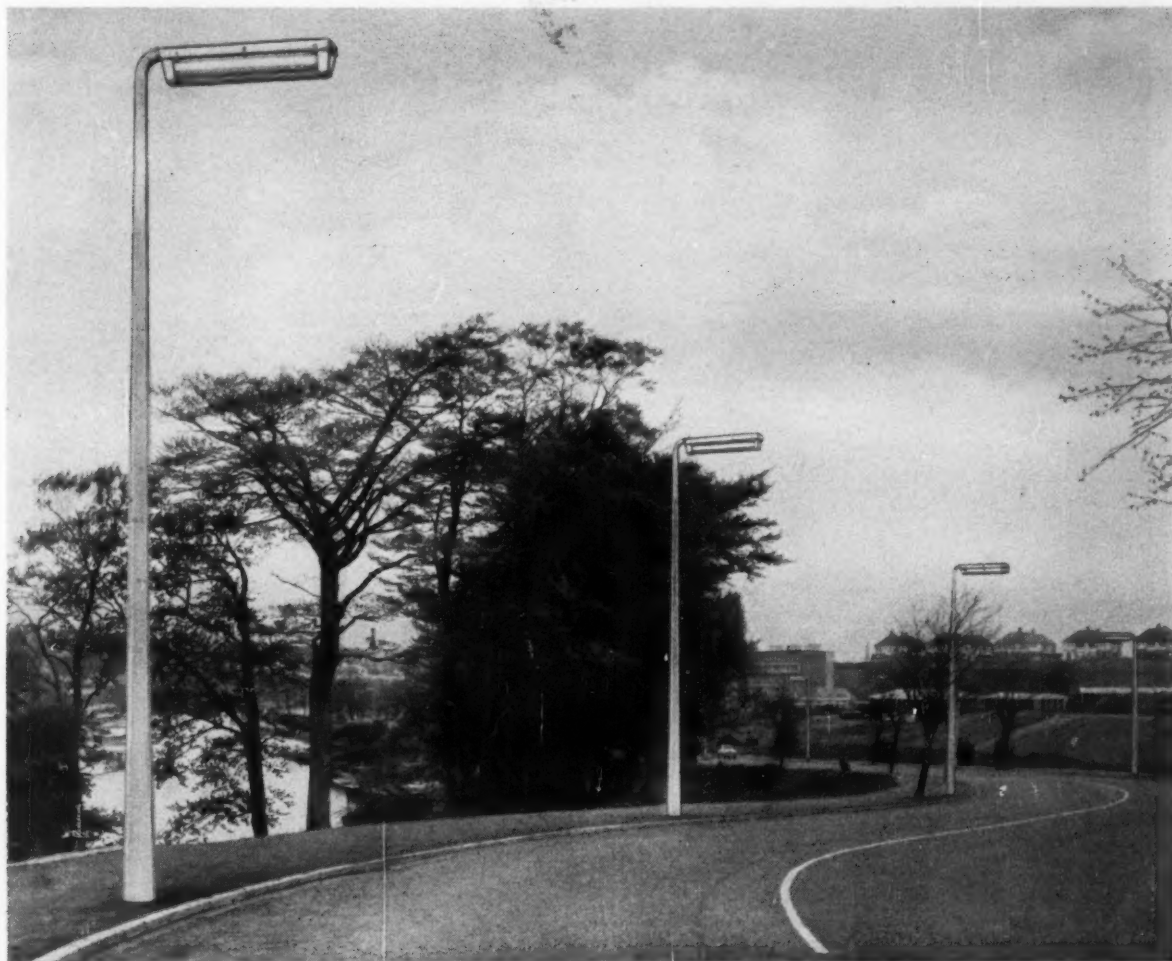
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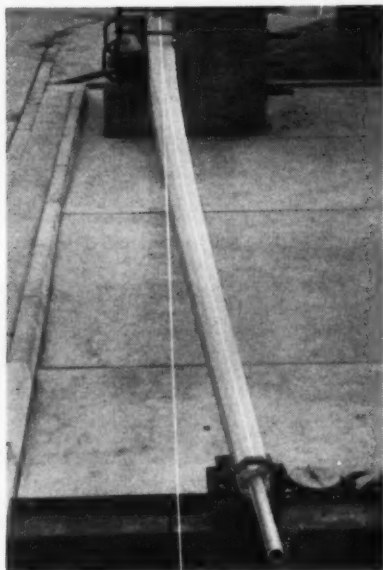
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18 LOWNDES STREET, LONDON, S.W.1

*Telephone Number Belgravia 1691*



Photograph of one of many Stanton designs acceptable to the Ministry of Transport for use on trunk roads and approved by The Council of Industrial Design.



# STANTON

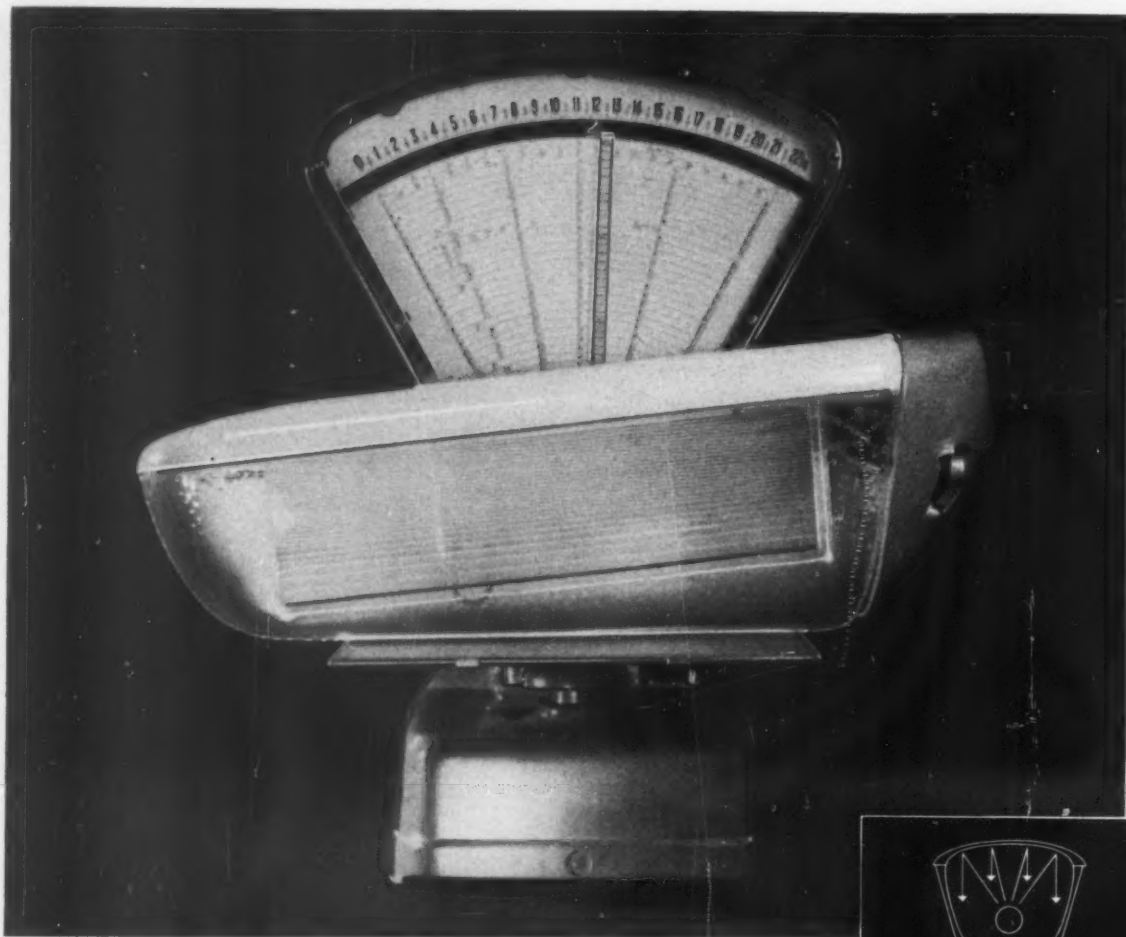
## Prestressed Spun Concrete Lighting Columns

Stanton Type 8K Spun Concrete Lighting Columns at Belfast, fitted with Siemens Ediswan 'Corporation' 5-ft. fluorescent lanterns.

Photograph by courtesy of R. Watson, Esq., B.A., B.A.I., M.I.E.E., Belfast City Electrical Engineer.

Spun concrete column under a load of 1,092 lb. showing a deflection of  $13\frac{1}{2}$  inches. (The British Standard 1308:1957 proof test load is 320 lb.)

**The Stanton Ironworks Company Limited Near Nottingham**



## 'Perspex' gives light with lightness

**T**HIS Revo street-lighting lantern weighs only 12 lbs, yet it is over two feet long. It is designed for use with 140-watt sodium lamps and both the bowl and the canopy are made from 'Perspex' acrylic sheet.

Clear 'Perspex' is used for the bowl, slightly patterned to obscure the fittings inside. On each side, areas have been left unpatterned and refractor plates cemented to them. The plates are machined from 'Perspex' and designed to give the most efficient light distribution.

The efficiency of the lantern is completed by its canopy, which is made from a dense grade of Opal 'Perspex' and reflects more than eighty per cent of the light falling on it. This high reflectivity, together with the general optical efficiency of 'Perspex', is maintained throughout a very long life—ensuring the trouble free service over many years which is so essential in street lighting fittings.

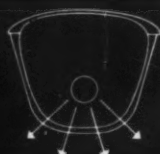
Acrylic materials are unique in combining very light weight, optical efficiency and an almost complete immunity to weather. 'Perspex' acrylic sheet and 'Diakon' acrylic polymer offer these properties to the lighting fitting designer in a form that is both good looking and easy to work.

'Perspex' is the registered  
trade mark for the acrylic sheet  
manufactured by I.C.I.

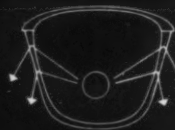
**'PERSPEX'**



Reflection from Opal 'Perspex'  
canopy—over 80%.



Transmission through base of clear  
'Perspex' bowl—90%.



Refraction by machined 'Perspex'  
refractor plates designed to give  
most efficient light distribution.



# THE COUNTY RANGE OF FLUORESCENT FITTINGS

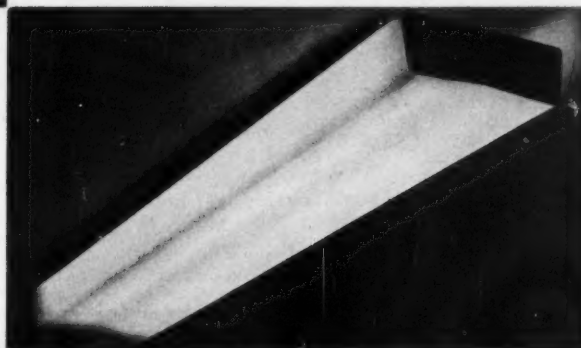


Surrey

Fittings with clean and functional lines following the modern trend of interior design.

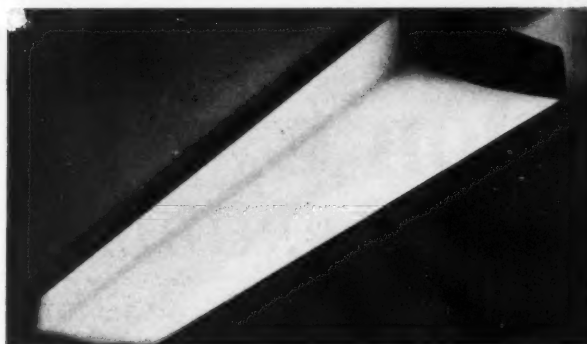
Opal Perspex diffusers with black ends and practically invisible back spines result in high quality fittings reasonably priced.

They are designed as diffusing fittings and not based on an industrial back spine, consequently the lamps and reflectors can be arranged to give maximum efficiency with a wide and shallow diffuser.



Essex

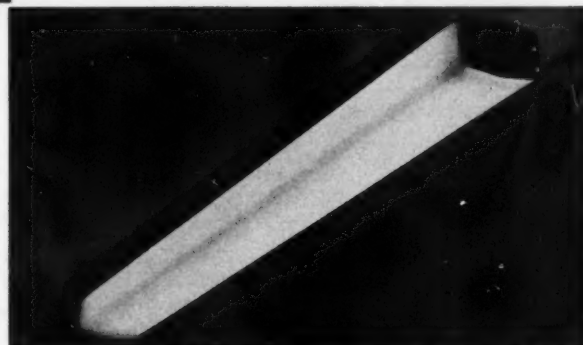
Ease of maintenance has been an important consideration in the design of the fittings, the diffusers tilting off from either side for cleaning and lamp replacement. Access to control gear is from below.



Sussex

Only the best materials are used in the production of the fittings including heavy gauge steel, Perspex diffusers and reliable control gear.

APPROVED BY THE COUNCIL OF INDUSTRIAL DESIGN FOR INCLUSION IN THE DESIGN INDEX



Kent

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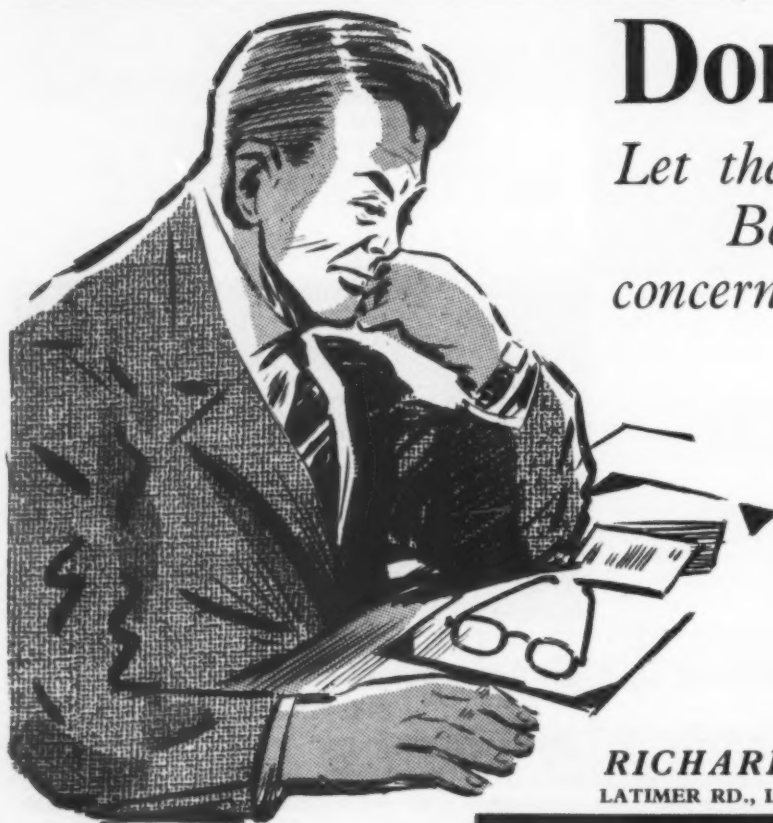
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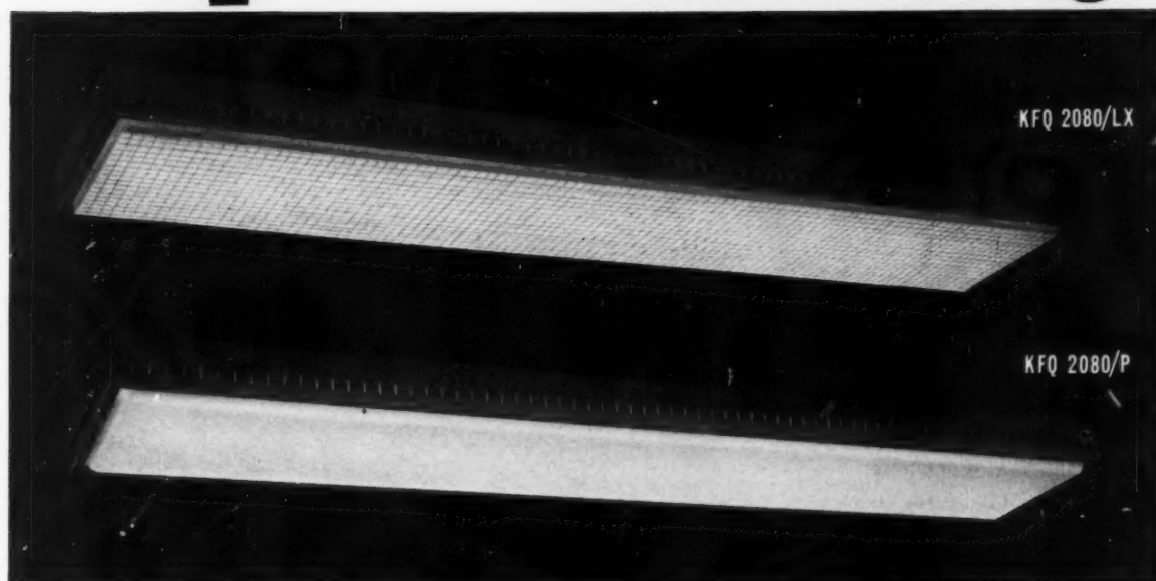


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*Let that PROBLEM  
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## for commercial lighting

These latest additions to the Atlas KE and GJ ranges of fluorescent fittings are specially designed for use in offices and stores, where both decorative effect and efficiency must be of a high order. They provide wide scope for variation in ceiling layout, and incorporate many unique features for extreme ease of installation and servicing.

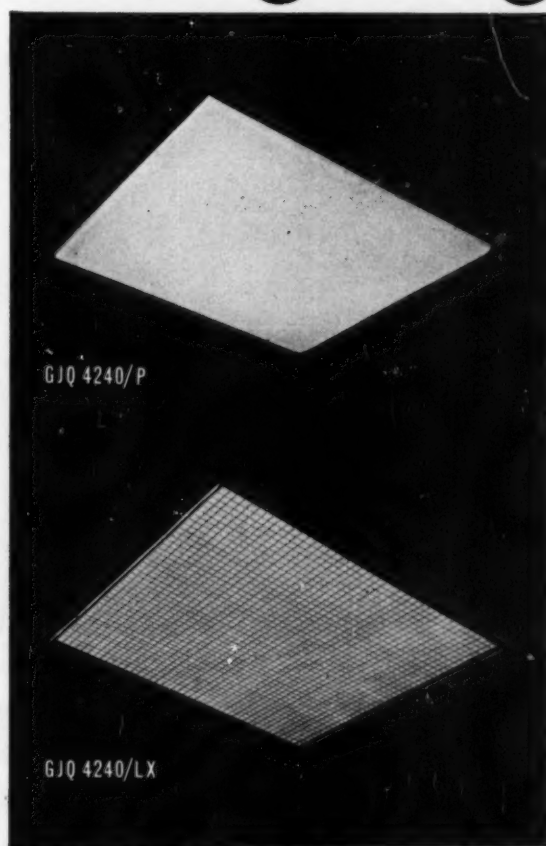
**KFQ/2080/P and /LX** are based on a simple batten fitting, with an extremely neat section, and house two 5ft. 80w. tubes with quick-start control gear. Spring-loaded lampholders facilitate fast re-lamping. The metal frame of both fittings is finished in mushroom grey, and slotted on all four sides. The type P incorporates an opal 'Perspex' dish, and the type LX has a Louverex diffuser.

**GJQ/4240/P and /LX** are slim 'wafer' fittings, square in shape (28" x 28"), for surface mounting. They incorporate four 2ft. 40w. tubes and quick-start control gear. The type P has an attractive single-piece 'Perspex' diffuser, fitting neatly into a mushroom grey metal frame, slotted to give an added degree of sparkle. The type LX also incorporates the slotted frame, with a 'Louverex' diffuser giving a greater concentration of downward light.

**ATLAS LIGHTING LIMITED,**

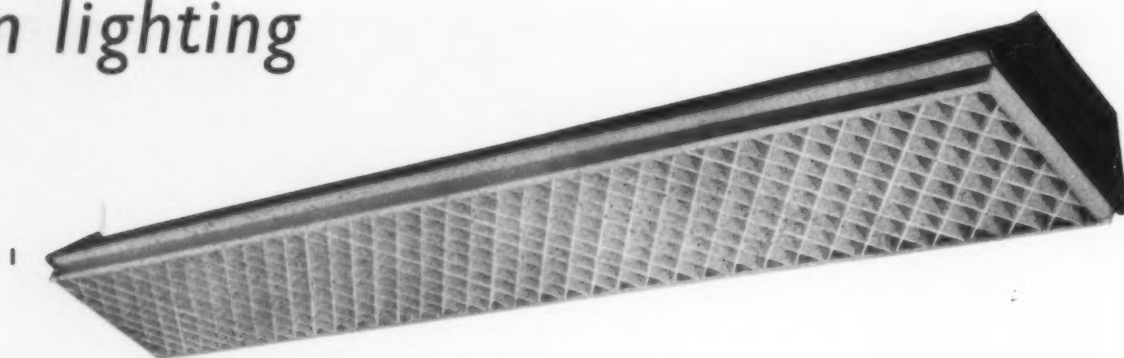
*A subsidiary company of Thorn Electrical Industries Ltd.*

Thorn House, Upper St. Martin's Lane, London, WC2

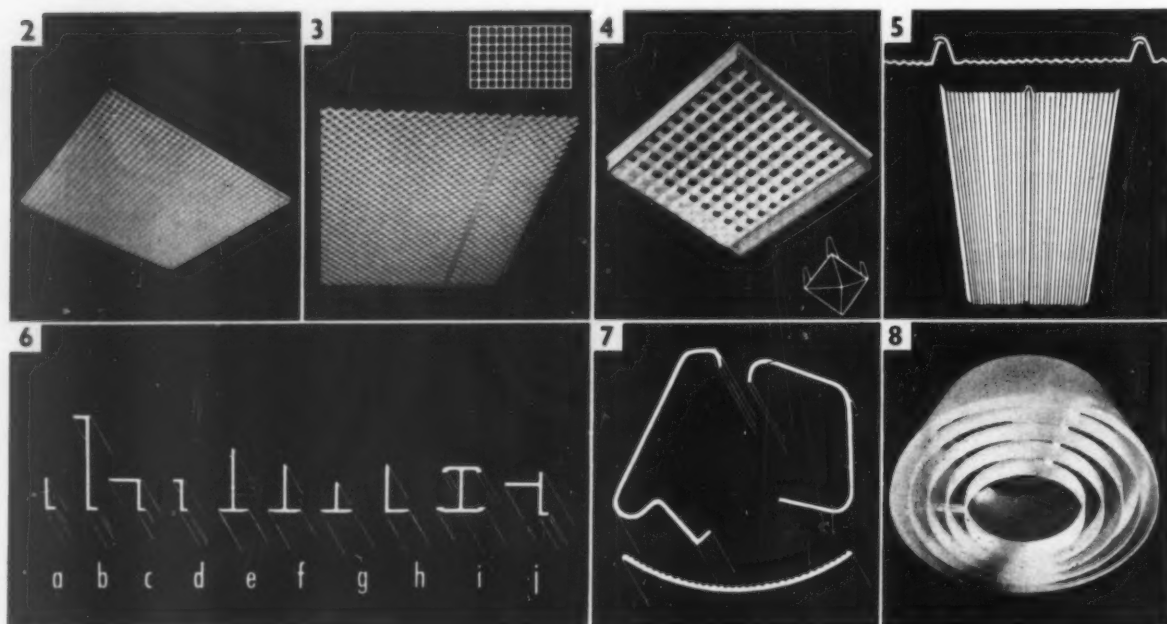


DTV

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- 7 Sections of plastic extruded diffusers, as supplied to lighting manufacturers.
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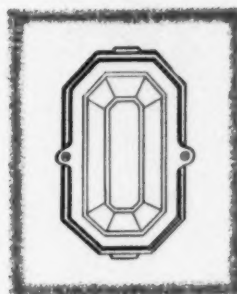
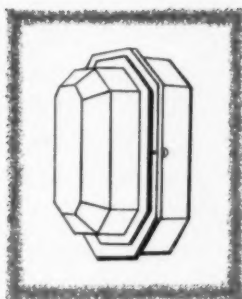
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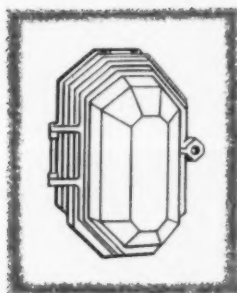
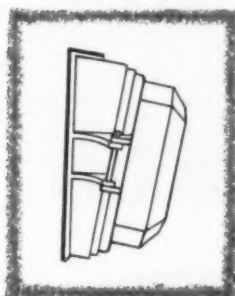


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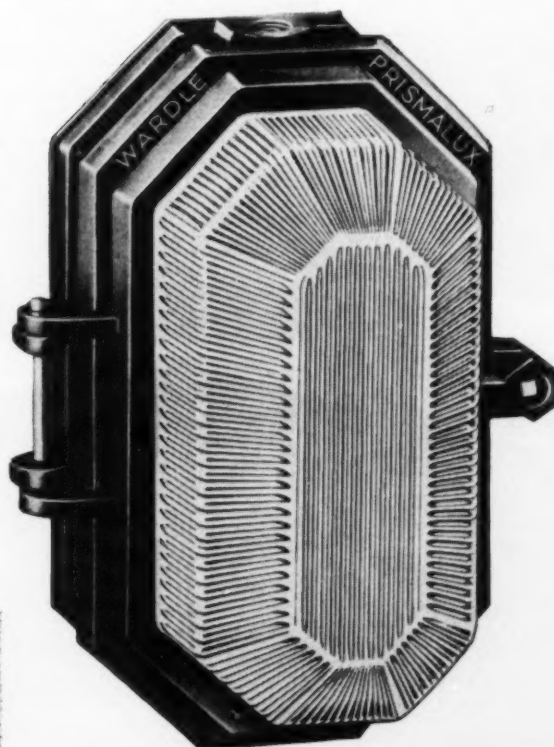


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for all applications.



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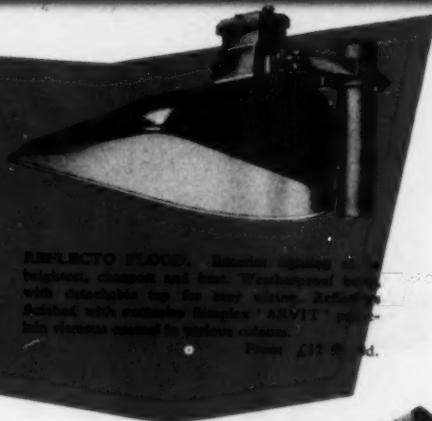
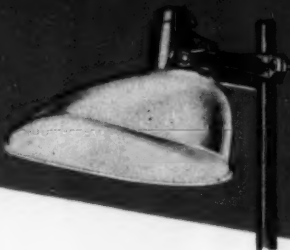
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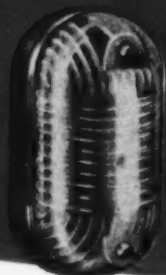


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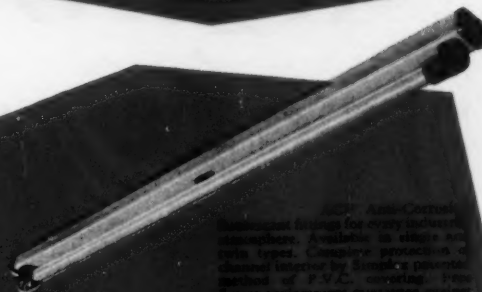
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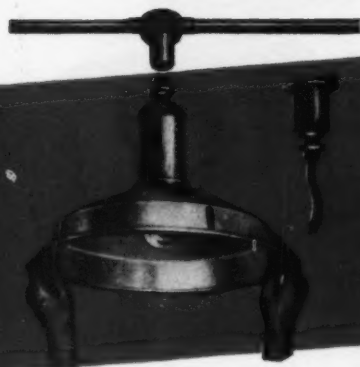


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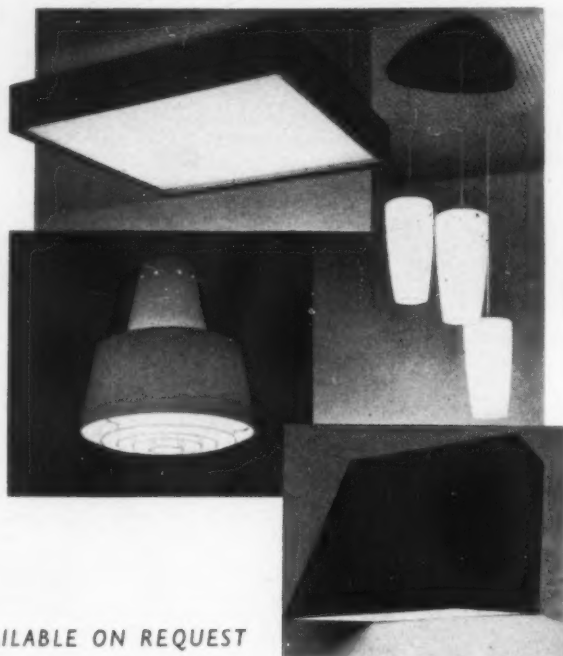
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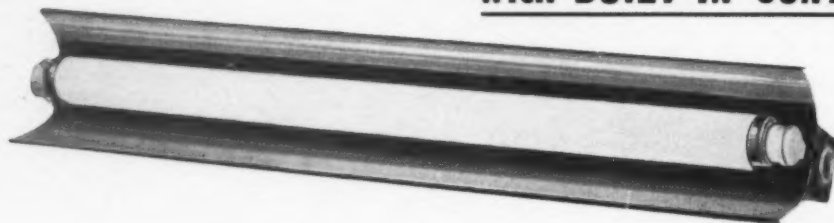


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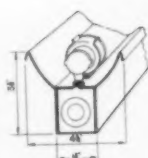
LK

For the first time small-sectioned Fluorescent Reflectors are available with built-in super-slim control gear, offering substantial economies in installation and maintenance costs.

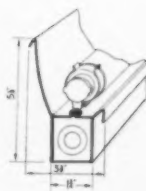
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LK



LJ



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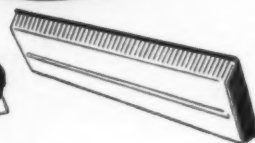
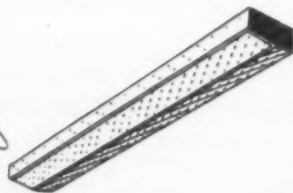
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**Sketchbook in Milan:** Impressions by R. L. C. Tate of the lighting in the Pirelli Centre and other parts of the city noted during his visit to the Triennale (page 17)

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**Lighting Abstracts:** A record of recently published works in lighting and allied subjects (page 22)

**New Products:** Information on recently introduced lighting equipment (page 24)

**Fluorescent fittings in mass production:** Brief account of new extensions to Thorn's Spennymoor factories for production of fluorescent control gear and lighting fittings (page 26)

**IES Activities:** December sessional meeting on visual problems of motorways—Events in the Centres—Recent publications—Coming meetings (page 27)

**Miscellany:** Book review—Personal—Obituary—Overseas news—Industrial notes—Situations vacant (page 28)

**Postscript:** by 'Lumeritas' (page 30)

## Respite Prospice

In recent years the lighting industry has seen many changes, changes in materials, light sources, application techniques and in organization within the industry to cope with changing circumstances. In accordance with our usual practice we devote a large part of this January issue to a review of the past year during which, according to our contributor, the lighting industry in this country appears to have been more concerned with its own destiny than with dramatic developments. That the industry is, after some prodding by us and by the IES, now giving more attention to the education of its future workers is, to say the least, encouraging, for without the men to do the job the industry cannot prosper. It is sometimes said that, in some respects, the British lighting industry lags behind that of other countries in development and practice. In 'Light and Lighting' we try to draw attention to interesting work in all countries and no one would dream of claiming that any one country has a monopoly of new ideas. We all have something to learn and it is a feature of lighting people everywhere that they are always willing to exchange ideas. If it is true that 1960 held little drama for the lighting engineer, it may be because previous years held so much and a time had come to take stock, to review the present state of affairs and to plan for the future. There is a great deal of work now going on under the aegis of the IES which we are confident will place this country well to the fore in lighting practice and which, together with the work of our research establishments and with a progressive programme of education, should ensure a very bright future for the industry.

# Notes and News

BECAUSE OF THE DIFFICULTY of raising sufficient students it is not possible to arrange courses at technical colleges in the provinces for all who wish to take the City and Guilds examinations in illuminating engineering and many students therefore have to prepare themselves for the examinations either by taking a correspondence course or by private study. Such students miss the practical instruction which can be given at a college. The IES Education Committee is considering arranging a one-week practical course for these students in London beginning on April 17.

The course would be for those preparing for the Intermediate examination in May this year and would be on practical photometry, the aim being to demonstrate the methods used to arrive at data commonly used by lighting engineers. The proposal is that those taking part would be divided into groups of not more than five or six and attached for the week to one of the lighting laboratories in the London area where they would not only be given instruction but have the opportunity of carrying out practical work under expert guidance.

Coming just before the May examinations such a course should be of great value. Those wishing to take part or to receive more particulars should write to the Secretary of the IES giving their age, educational qualifications and stating their present method of study—whether privately or by correspondence course. Accommodation in London for the week would have to be arranged by the individuals themselves. Sustaining Members of the Society have been informed of this proposal and it is hoped that they will be willing to release their students for this purpose.

Turning to more advanced education in lighting we have to report that the recent course of six lectures at Northampton College of Advanced Technology was an outstanding success. The notices for the course made it quite clear that it was of an advanced nature and the synopses of the lectures were almost frightening; nevertheless some eighty students enrolled and the lecture theatre was full on every occasion—a clear indication that qualified lighting engineers are anxious to keep abreast of recent work. The lectures were admirably presented and Dr Padgham, who organized the course, is to be congratulated.

Some readers may be interested in another course of ten lectures on 'Vision in Industry' which is to be held at the Northampton College on Wednesday evenings beginning January 18. Full details of the course can be obtained from the college, St John Street, London, EC1.

## Overseas Lighting Conferences 1961

THE DATES OF CONFERENCES of overseas lighting societies which have so far been notified to us are: Associazione Italiana di Illuminazione, Turin, May 11–13; Association Française de l'Eclairage, Rouen, May 29–31; Illuminating Engineering Society of America, St Louis, September 24–29.

None of the programmes is, of course, available at this early stage but the dates might be noted together with the warm welcome that would be extended to visitors by all three organizations.

The French AFE and the American IES are well known. We reported some time ago the formation in 1959 of the society in Italy which we gather now has over 600 members and has the support of 100 firms in the Italian lighting industry, a very encouraging growth in so short a time. The meeting to be held in Turin in May will be the Society's first national conference and representatives from many European countries are expected to be present. It is understood that the main theme of the conference will be streetlighting and floodlighting, though there will no doubt be papers on other subjects. Readers will remember that our annual *International Review* always includes a number of pictures of spectacular or artistic lighting installations in Italy; the meeting in Turin will provide an opportunity of hearing about and seeing Italian lighting practice at first hand.

## Buildings by Night

SOME INTERESTING ASPECTS of the lighting of buildings were brought out by John Reid in two lectures recently in Manchester and Liverpool arranged by the British Lighting Council in association with the Manchester Society of Architects and the Liverpool Architectural Society. After referring to the primitive light sources of the past and to the wealth of fluorescent and incandescent lamps and methods of controlling their light output that is now available, Mr Reid pointed out that it is now possible to create divisions of space by light alone, quoting as an example an auditorium at the 11th Triennale in Milan which was created within a larger space by low-hanging lighting fittings.

The importance of the lighted appearance of buildings at night was at last being realized. He mentioned the Austrian pavilion at Brussels in 1958. By day it was a great slab-like building suspended in the air on stilts, but at night by lighting up the flat underside of the building and



by having the walls of the structure lit from inside, the appearance was completely reversed and instead of being a heavy block it seemed to be something light and transparent floating almost miraculously in the air. In the German pavilion at the same exhibition, light from hidden sources was beamed on to the floor which reflected it up to the ceiling giving an extremely pleasing soft and warm lighting effect. The same thing, said Mr Reid, could be done for more permanent buildings. The UNESCO building, for example, is entirely satisfactory both by day and by night and is additionally interesting from the point of view of the use of a combination of different light sources. It is essential if a building is to look a coherent whole by night that the lighting inside be designed to some definite overall plan. In the UNESCO building all the office floors are lit by fluorescent tubes whilst the main concourse on ground level is lit by incandescent lamps. At night the scheme has unity because the whole thing was carefully planned but it can be imagined how disastrous the effect would have been if the lamps had been indiscriminately mixed with odd offices equipped with incandescent lamps forming patches of different colour. Such lack of planning can and does reduce the appearance of modern building at night to chaos as anyone can see by looking around any city in this country at the present time.

### Dazzle at Westminster

DAZZLE FROM MOTOR VEHICLE HEADLIGHTS has been concerning Members of Parliament recently. On that controversial subject, amber or white light for headlights, the Minister of Transport, Mr Marples, stated that research had not shown that amber headlights had any advantage over white headlights of equal power and in fact had some disadvantage in range of visibility. The answer to the dazzle problem lay in correct aiming of the beam. This attitude may also have contributed to the Government's decision not to extend the installation of anti-dazzle screens on M1. This was stated by Lord Chesham, Joint Parliamentary Secretary to the Ministry. Although studies of the fence were continuing, he said that experiment had not established that in present traffic conditions there was a good case for providing the screen. He suggested that it caused drivers to use the full beam continually, so dazzling drivers in front of them. Visibility on the new Forth Road Bridge was also being studied, and a variety of methods, including lighting, was being used to ensure maximum seeing conditions in all weathers.

### Road Furniture on Show

FURTHER EVIDENCE of the streetlighting consciousness which this country has developed is provided on London's South Bank, where the LCC has provided a site for the Council of Industrial Design to display items of road

furniture, including a number of streetlighting columns and lanterns. All exhibits have been chosen from the Council's Design Index and their display here in an all-the-year-round exhibition should, it is hoped, reduce the time between the introduction of new models and their appearance on the streets. There are two 35-ft and two 30-ft columns, each fitted with a sodium linear lantern and three 25-ft columns forming the Group A section of the display. In the Group B section, there are five 15-ft columns, and four other designs of mounting heights down to 10 ft, and to show that intermediate mounting heights have not been ignored, there is one design of 22½ ft. The display is unattended, but catalogues may be obtained from the C.O.D.



Some of the Group B (upper picture) and Group A (lower picture) columns and lanterns at the Council of Industrial Design's permanent exhibition of street furniture on the South Bank.



The reflection of the 'Lucky Horseshoe' motif of this year's illuminations at Bournemouth mirrors a year which, despite the horseshoe's proverbial magic power, has been generally un-magical in its weather. Rain apart, the horseshoe also symbolizes the sparkle with which, in some circumstances, bare lamps can enhance an otherwise sombre scene but which in other circumstances becomes irritating glare, another topic very much to the forefront in 1960.

# Random Review of 1960

By HARRY HEWITT

AN INTERESTING YEAR . . . but not an exciting year . . . higher illumination levels . . . cheaper tubes . . . glare . . . ASEE . . . design awards . . . new Codes . . . fire-works . . . Harrogate . . . glare . . . glow-worms . . . colour-rendering . . . slim ballasts . . . glare . . . lighted ceilings . . . lighted walls . . . APPLE . . . glare . . . gaslamps . . . rain . . . *son et lumière* . . . rain . . .

None of these subjects is new to the lighting man—except, perhaps, the glow-worms. And this, surely, was the lighting story of the year; it even made the columns of the national Press for several days, albeit in the 'silly season'. It appears that glow-worms in the west country in the summer of 1960 were seen to be shining far more brightly than had been their wont. This aroused a particular interest amongst lighting people, who were quick to recognize that this phenomenon was in line with the general trend towards higher levels of illumination. It was even suggested that these glow-worms were of American origin and had come under the influence of the new American IES Code.

Although our own revised Code is not yet ready for publication, we seemed to say our final word on illumination levels when the Leon Gaster Memorial Premium was awarded to Mr H. C. Weston for his Summer Meeting paper 'Rationally Recommended Illumination Levels'—a paper which carried its sting in its title. All the same, I think many of us are uncomfortably aware that a gap exists between the impressive British experimental work on visual performance and our recommended illumination levels which are derived largely from accumulated experience with one eye on economics. This gap can only be filled by painstaking work in the study of many visual tasks, and until such work is done we shall lack confidence in our prescriptions for both quantity and quality in lighting.

Although we are not likely to go to the very high levels of illumination recommended in the USA, some modest increases in British recommendations can be foreseen. This will also, of course, mean a considerable increase in 'lighting hours', for the British Lighting Council has been pointing out that as the required illumination level increases, the adequacy of daylight decreases. Assuming a 2 per cent daylight factor, it has been estimated that the lighting hours will increase in the same proportion as the illumination level. This means the sale of more units, the sale of more lamps, and greater emphasis on supplementary artificial lighting.

During 1960 a good deal of further work has been done to try to arrive at some definite recommendations on the control of glare in general lighting installations using regular arrays of fittings. At the same time, however, I am glad to know that Dr

Hopkinson at the Building Research Station is doing some more work, in association with Cornell University in the United States, on glare from large area sources. I am particularly interested in this subject, not only because of the present fashion for luminous ceilings, but also because of the interesting technical point involved when  $B_s$ , the source brightness, and  $B_b$ , the background brightness, get all mixed up.

I cannot resist saying once again that whilst all this work to guard against discomfort is necessary and admirable, we must not allow it to run away with us, for there is a degree of 'glare' which can often be acceptable and attractive in a lighting installation. Our lighting vocabulary seems to be short of a word for 'acceptable glare'. I would be prepared to settle for 'radiance' but I am told by the pundits that the International Vocabulary uses this word for serious technical purposes; what a pity!

I hope no one will accuse me of favouritism if I appoint my colleague Richard Stevens 'the lighting personality of the year', for surely he deserves this title as much as he deserved the three Design Awards of the Council of Industrial Design. It was unusual for as many as three lighting products to be included in one year's awards, but when these products come not only from one firm but from one designer, there is indeed a call for at least a small fanfare.

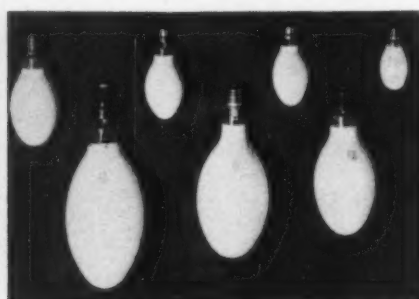
Another award that is worthy of note is that of a 'certificate of exceptional merit' to Troughton and Young for the design of their lighting fittings catalogue; this has an admirably clear layout of photographs and outline sketches and I thought the incorporation of the various fittings colours on the cover was a clever idea. Amongst other publications must be mentioned the new look given to *Light and Lighting* and also to the BLC Handbook 'Industrial Lighting', a most successful publication which first appeared in LSB days and which has now been revised very effectively.

The preparation of a new edition of the IES Code has engaged the attention of many workers in the Society and a number of panels of the Technical Committee have been hard at work for many months. In fact, the Society, having reorganized its constitution and then celebrated its Jubilee seems to have gone all technical—and I am sure no one will object. Not that the Society is in danger of taking itself too seriously. Those of us who attend London meetings will recall the cheerful occasion some months ago when John Grundy presented his paper on ship lighting. After the President had been 'piped aboard' the author delivered a salty version of his paper, his demonstrations calling for the assistance of the Navy and—invariably—the pretty girl.

The IES Summer Meeting at Harrogate was

... I appoint my colleague Richard Stevens 'lighting personality of the year' ...





Left, use of 400w mercury-vapour lamps for plant growth, showing part of a 360 lm/ft<sup>2</sup> installation at Fison's Research Station. Centre, practical applications of electroluminescence in examples of Atlas luminous panels for aircraft. Right, the complete family of Philips' colour-corrected mercury lamps, ranging from 50w to 1,000w.

generally voted to be a great success, and the 'working day', in which various groups got down to serious technicalities, turned out to be a very successful experiment. My own view is that meetings of this kind could also be held during the normal Session.

I was able to spend only one day at the APLE Conference at Folkestone, but I chose the day on which Mr Waldram presented his paper which, together with the subsequent discussion, created even more interest in the forthcoming revision of the street lighting Code of Practice. In many people's minds there seems to be a growing tendency to accept not only higher street lighting levels but also some new thoughts on the cut-off principle, though how far this tendency will go in the next decade will no doubt depend upon what is said in the revised Code.

In London we had the usual crop of exhibitions and every few weeks we seemed to make a journey to either Olympia or Earls Court. On almost all these occasions we saw a pitiful display of exhibition stand lighting; I wonder whether the bare batten fittings are included with the shell of the stand at an all-in price which the exhibitor finds hard to resist?

When I commented last year on the ASEE Exhibition of 1959 I was able to give good marks to Philips for their ingenious stand, but this year they puzzled me with their demonstration of ships sailing on a colour triangle; could it be that trichromatic co-ordinates are to be used for navigational purposes? Still, I did like their little London red buses going through the various colour cabinets to tell the story of colour-rendering under different lamps. Colour-rendering also engaged the attention of Atlas, but they played safe and so attracted many serious electrical engineers to see the glamorous twins and to guess which was the 'de luxe natural' twin.

It was good to see the prominence of lighting at two very different exhibitions, the Physical Society's Exhibition (where there seemed to be a permanent queue to see the Colour Group's section), and the Ideal Home Exhibition where the GEC's stand devoted to lighting and colour was very effective.

## Lamps, Life and Lumens

MY READERS WILL NOT BE SURPRISED to know that in preparing Random Review I am helped by generous contributions of information and opinion from many parts of the industry, and you may care to believe

that I received the following letter from a tungsten filament:

Dear Sir,—When I was very young I was just a piece of tungsten wire—straight, I was—and they put me inside a glass bulb and took out all the air and left me by myself to shine and shine, and I shone for hours and hours, for a thousand hours and more sometimes. But then they put some gas inside my bulb and that made me feel chilly so I didn't shine brightly at all, until they said that if I curled up I would be warmer and when I tried it I found that they were right and I shone so brightly that they said I was glaring at people so they etched the inside of my bulb and how would *you* feel if somebody etched *your* inside?

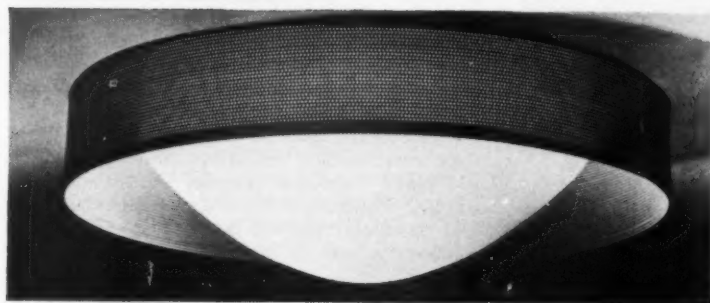
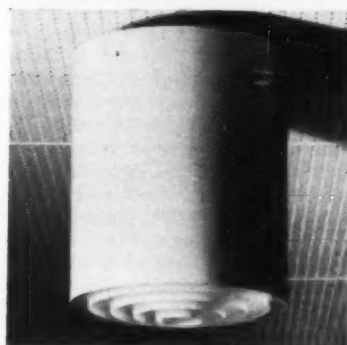
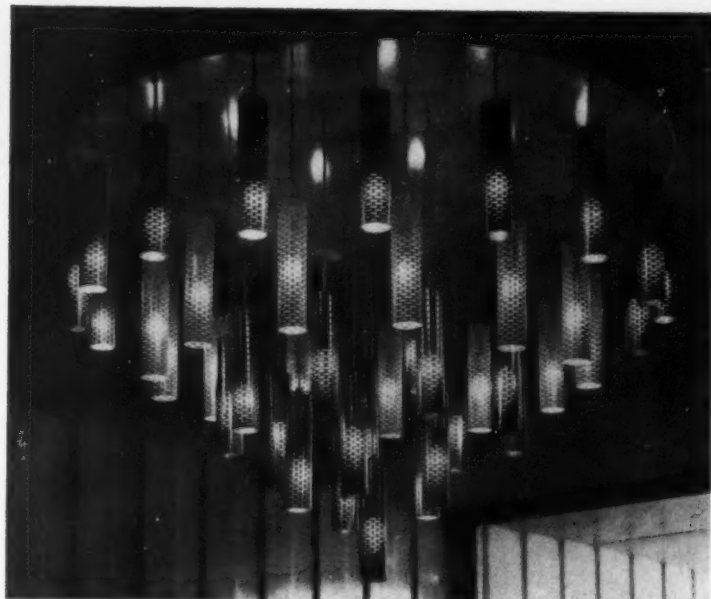
Then they said that if I curled up once again I would feel warmer and that if I became a curled-curl I would be 'up to 20 per cent more efficient' so I became brighter still and again they said I was glaring but this time they were much kinder to my bulb and powdered its inside instead and this looked quite nice until they squashed it to make us look neater, but do you think *you* would look neater if you were shaped like a mushroom?

Then some of them came along and said I should take things a bit more easily and not burn the candle at both ends and that then I would last twice as long, but that sounded a bit dim to me until the others started to talk again about my curled-curl trick and 'up to 20 per cent more efficient' so I asked them was this the same 20 per cent that they were talking about ten years ago but they didn't answer—they only sulked.

But only the other day a kind friend said I could relax because I didn't need my curled-curl trick any more and he didn't even mention the 20 per cent. I hope he's right.—Yours, etc.

Leaving incandescent lamps and considering fluorescent tubes, 1960 has been a singularly inactive year, for, unless my memory plays me false, no manufacturer has announced an increase in tube efficiency, not even the odd lumen per watt. Nevertheless, I am sure that the manufacturers would use political language and describe 1960 not as a year of 'no progress' but as a year of 'consolidation'. We did, however, see the introduction of new tube colours. The launching last year of the de luxe natural tube was followed first by Philips' Colour 34, a double-coated tube with a colour temperature of 4,200°K, and later by AEI's 'Kolor-rite' lamp which





'... the cylinder is "U" for 1960.'

1, Cascade fittings by Rotaflex; 2, one of the 'drum' series of fittings with translucent louvers by Merchant Adventurers; 3, examples of the Atlas 'Finlandia' range which uses cylinders of glass; 4, a combined dome and drum fitting for filament lamps by Harris and Sheldon.

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is claimed to have an effect similar to noon skylight and seems to fall between the existing daylight and natural tubes.

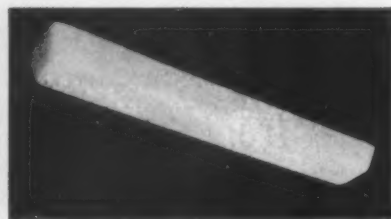
There seems to be a general tendency amongst manufacturers to improve existing de luxe colours, and this tendency is perhaps emphasized by the fact that when most manufacturers reduced tube prices in September, the reductions applied only to the standard tubes, leaving a 'premium' on the de luxe colours.

I was glad to see evidence during the year that at last there is a growing use of the miniature fluorescent tube. We are now beginning to see fittings developed specially for use with these tubes, including the very nicely-designed bulk-head units marketed by Victor Products and others. It is also being appreciated that some demands for local lighting in industry can be satisfied by the miniature tube, for where a directional effect is not necessary and conditions allow the tube to be mounted close to the task, very effective results can be obtained without the usual heating troubles associated with local lighting. Many people are surprised to find that a few inches from one of these miniature tubes you can get an illumination level of some 150 lm/ft<sup>2</sup>.

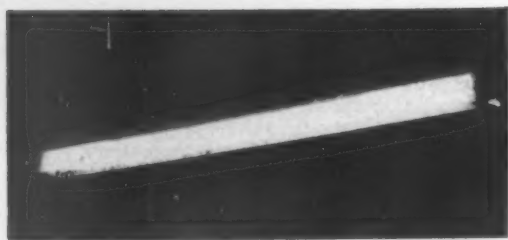
A new version of the fluorescent tube is the 'aperture tube' which was shown as a development project on the Atlas stand at the APLE Exhibition. This tube derives from the reflector tube, but the reflecting medium covers almost the whole of the inner surface, leaving a narrow clear window which can develop a luminance as high as 20,000 ft Lamberts. When associated with the correct optical system it is possible to achieve a powerful flat beam which could be considered as a source for the lighting of vertical surfaces, for the lighting of roadways from parapet height and possibly for the lighting of intersections on motorways.

I am afraid that during the last few years I have tended to think of cold cathode fluorescent lighting as being used chiefly for decorative and advertising purposes, but during 1960 I have wondered whether this source of light may not be winning new favour for general lighting purposes. Ionlite tubes are used for the interior lighting of Castrol House in London, whilst AEI equipment has been used in an unusual installation at Harwell where in a hemispherical magnet room the general lighting to a level of 20 lm/ft<sup>2</sup> is provided by four-tube fittings mounted above the cranes. Over 3,000 GEC cold cathode fittings are used in the new BEA hangars at London Airport; this adds up to 22 miles of tubing—which seems quite a lot to me. But when de Havilland's wanted to improve the lighting in their Comet hangar at Hatfield they decided to retain the existing reflectors (previously used for 1,000w incandescent lamps) and install 134 Philips 400w mercury reflector lamps. The external reflectors act only in a protective capacity as the utilization of the light is controlled by the reflector within the lamp.

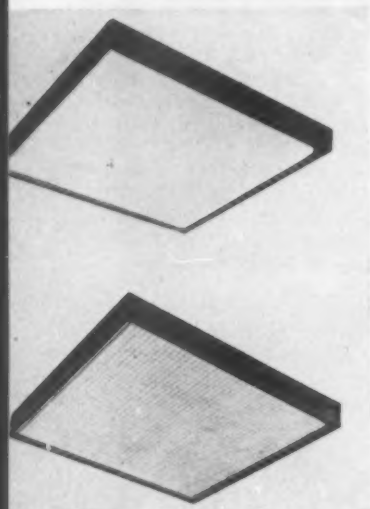
Of the normal (non-reflecting) colour-corrected mercury lamps it is possible now for me to say that these lamps have really 'arrived'; especially when one can publish a photograph of the complete Philips' 'family' rated at 50w, 80w, 125w, 250w, 400w, 700w and 1,000w. Yet Philips still find uses for the 'old-fashioned' plain mercury lamps. One application is in plant growth and a notable installation is at Fisons' Research Station at Levington in Suffolk where 192 of these lamps are used in all to give an illumination level of 350 lm/ft<sup>2</sup>.



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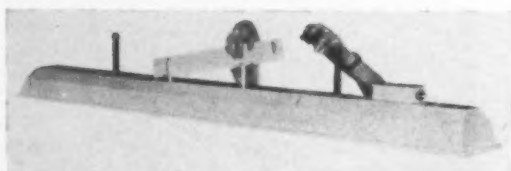


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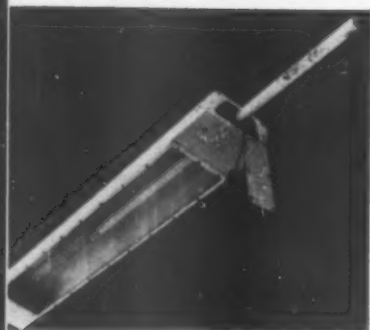


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Simplicity in outline characterizes many currently popular fluorescent fittings: 1, the 'Sussex' luminaire by Harris and Sheldon; 2, a fitting designed by Major Equipment in association with the British Transport Commission; 3, versatile fitting from SLR Electric, available as one piece up to 16 ft long; 4, two examples of Atlas 'wafer' fittings with either opal 'Perspex' or square-section 'Louverex' panels; 5, simplicity in connection is a feature of this fitting designed by AEI Lamp and Lighting Co for Shell tankers; whilst the same firm have produced in 6 a test-proof fitting used in Rowntree's Newcastle factory with simplicity of access for relamping.



5



6

You will remember that 1959 saw the introduction of the 200w linear sodium lamp and this lamp has continued to gain a good deal of publicity during 1960 whilst a number of local authorities have used it in street lighting installations. Apparently this line of thinking does not stop with the 3-ft lamp and an experimental 4-ft version was on show at the APLE Exhibition.

Mr Jenkins of GEC demonstrated the quartz iodine tungsten filament lamp when he presented his paper at the IES Summer Meeting. The lamp consists of a tungsten filament in a quartz tube containing iodine which is used as a regenerative agent to deposit evaporated tungsten back again on to the filament. It is claimed that this results in increased efficiency (up to 22 lm/w) and a considerable improvement in lumen maintenance. This lamp is, of course, a high brightness source and it will be interesting to see how it is applied in practice. One of the interesting possibilities referred to by Mr Jenkins was to use the lamp as a ballast to the mercury vapour lamp.

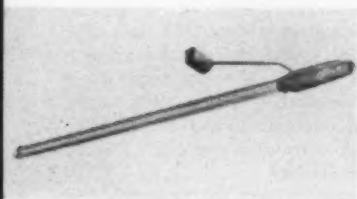
Another light source which continues to find new applications is the electroluminescent panel, and probably many people who attended the IES paper in London given by Dr Ranby and Mr Clewer were surprised to see such a comprehensive demonstration of electroluminescent applications.

Although the xenon arc is certainly not a 1960 development it seems to be a lamp that is being talked about a good deal these days. I recently saw it demonstrated in the Low Countries as a source for lighting outdoor areas, and I understand that it will shortly be used in Germany for street lighting—as distinct from area lighting. At the same time the xenon arc is again being talked about as a useful source for colour-matching. It will be interesting to see whether this renewed interest will spur on any manufacturers to make the xenon arc a practical and commercial proposition in this country.

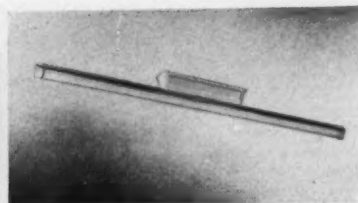
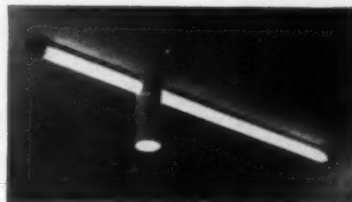
Of course, some of these light sources carry with them the necessity for control gear and, as I admitted last year, this is a subject that has never really excited me. Possibly I regard control gear as little more than a necessary evil, but I appreciate that there must be people to whom the subject is not only technically enthralling but financially rewarding. Philips have joined the ranks of those producing slimmer control gear for fluorescent lighting, and their polyester-filled ballasts have been incorporated in the new 'Streamlite' range of fittings. Transistor operation continues to excite a good deal of interest, and fluorescent lighting operated by this means seems to be making headway for various kinds of transport, as in the Philips transistor ballast to operate 9-in. fluorescent tubes for bed-head lighting in the new British Railways sleeping cars.

I am told, however, that passenger ships often nowadays enjoy a supply of a.c. and AEI are therefore providing 2,000 orthodox fluorescent fittings for each of three ships for the Royal Mail Lines. It is interesting to learn that fluorescent lighting was chosen because the illumination levels required could not have been achieved with incandescent lamps without a considerable increase in fuel consumption for ventilation and cooling. It is claimed that the power saved by using a high proportion of fluorescent lighting is nearly 250kw in each ship.

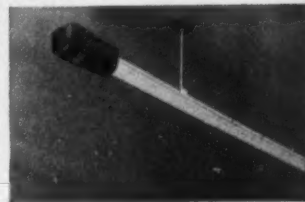
The Union-Castle Line chose mainly cold cathode fluorescent lighting for the *Windsor Castle* where GEC de luxe warm white cold cathode tubing is used in an ambitious system of cornice lighting. Coming



1. Mazda 'Netaline'.



3. GEC's 'Slendora'.



2

to the less glamorous parts of ships I was also interested in a special fluorescent fitting which has been developed for the new Shell tankers each of which requires 100 single-lamp fittings and 20 twin-lamp fittings in its engine room. In this fitting the complete control gear unit can be removed and replaced without disturbing the fitting itself. This is a design which must go to the credit of AEI—A.E.I. (Woolwich) Ltd, not A.E.I. Lamp and Lighting Co Ltd—I think.

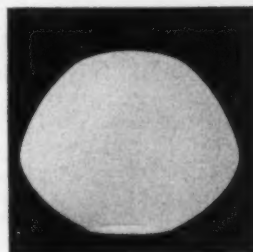
### Lighting Fittings and Lighting Features

I SEE THAT I HAVE ALREADY begun to talk about fittings. Nomenclature is not one of the lighting industry's strongest points and we are always distressed about the ugly term 'lighting fitting'. In recent years we have flirted with the alternative term 'luminaire', but this does not appear to have met with a cordial welcome. The way lighting is going at the moment, however, the word 'fitting' will become less and less appropriate as we move towards lighted ceilings, lighted walls and other features.

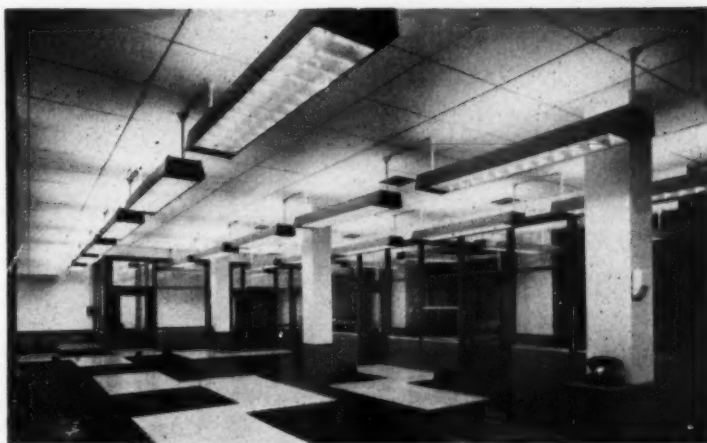
But first let me consider what can still legitimately be called 'fittings', and let me note first of all that possibly the greatest activity in 1960 has been in domestic fittings. This is certainly a welcome change, even if some of the new fittings are not designed to a very high standard. The remarkable increase in the number of designs is emphasized when one visits the lighting department of a departmental store—when one would also then see that the cylinder is 'U' for 1960. Incidentally, on a recent visit to Holland I found a similar upsurge of interest in new domestic fittings, but there it was not necessary to visit the stores to study the designs as the Dutch do not draw their curtains and it is quite easy to see the lighting equipment in use when travelling on any suburban road. You may consider this a piece of 'peeping tommy', but you can't stop a lighting man looking at lighting, and in any case, it is a well-established fact that the eye always tends towards the brightest part of the field of view. It was interesting to see that many central fittings are installed but not used, and the Dutch seem to rely upon wall lights, table lamps and standard lamps.

There appear to be similar trends in this country but again the question of glare crops up—this time in a rather contradictory way; for whilst people are prepared to buy suspended fittings with bare lamps, many new table lamps have completely opaque shades. A number of designers have put some measure of control on glare by using two cylinders, one inside the other, the inner one usually being white and the outer one coloured. An example of

1, Fitting fluorescent lighting for the kitchen: from left to right: the Mazda 'Netaline'; GEC's 'Slendora'; Crompton's 'Daintilite'; the Atlas 'Kitchenlight'. 2, Troughton and Young's satin opal glass bowl with recessed thread to take a sunken gallery. 3, Installation of GEC 'Comfort in Lighting' fittings. 4, Crompton 'Clenelght' fittings in a cold store.



3



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Long life makes cold cathode fluorescent lamps suitable for high-level mounting where difficulty of access requires relamping to be kept to a minimum; these installations, in the magnet room of the synchrotron project at Harwell and in a BEA maintenance hangar at London Airport, are good examples of its use in this way. (Photos: AEI, GEC)

this is the Atlas Finlandia range. These fittings are of Finnish glass and the coloured outer cylinders are particularly effective in slightly colouring the ceiling, though the useful downward light is, of course, white. This idea of using a coloured upward component of light was talked about some years ago but whilst it can be very effective it is not often that a designer achieves it deliberately.

Two other designs of fittings for incandescent lamps have caught my eye, one by Harris and Sheldon which uses a perforated surround to provide decorative sparkle, the other by Merchant Adventurers in a drum shape, made in a range of sizes and designed on very clean lines using a white opal formaldehyde louver.

With the reduction in bulb sizes of incandescent lamps comes a growing problem of heat dissipation in fittings, and I was interested to see that Troughton and Young have designed a special 'distance piece' for use with flexible pendants. This removes the cord grip some 2 in. from its usual position to one at which the cable temperature is much lower. Troughton and Young have also introduced a new and very effective design of satin opal glass fitting with a sunken threaded gallery.

I mentioned that the number of domestic fittings for incandescent lighting has been growing, but domestic fluorescent lighting remains concentrated chiefly in the kitchen, and I am told by the British Lighting Council that they estimate that some 400,000 kitchens now use fluorescent tubes. This means, of course, that there are still quite a lot of housewives to catch up with this modern boon but they are in the fortunate position of having at least four fittings from which to choose this item of kitchen equipment. Such interest in fluorescent lighting for the kitchen is understandable and it is here that the fluorescent tube has scored an undoubted success, though whether this will be followed by an expansion in the use of fluorescent lighting elsewhere in the home remains to be seen. Two dangers are ever-present in our minds; the possibility of noticeable choke hum (where chokes are used) and the possibility of interference with radio and television—a serious calamity in almost any home.

Fluorescent fittings for use in industry and in commercial premises showed no major developments in 1960 though I note the continued adoption of extruded plastics for diffusers. An interesting dust-proof fitting was developed by AEI for the Rowntree factory at Fawdon in which access for re-lamping is via a felt-gasketed end panel, clear plastic guides being provided to allow the lamp to be inserted easily into lampholders. This fitting was first developed in co-operation with Rowntree's engineers for their factory at York where they have been in use for over five years without requiring internal cleaning.

Last year I made reference to the GEC's 'Comfort in Lighting' range of fittings, and I was interested to see an installation recently at Gamages where it is possible to stand at one spot in the store and see simultaneously these low brightness fittings together with another fluorescent installation using conventional recessed fittings with 'Perspex' diffusers. The comparison is quite startling, but I still feel that merely to reduce glare in a departmental store is not sufficient; lighting can also be used to contribute positively to the display atmosphere.

New fittings designed along more orthodox lines have appeared during the year, and the general



tendency seems to be to continue with the rather severe and simple approach. Major Equipment, in association with the architect of the British Transport Commission, developed a special fitting for the Commission's offices at Melbury House. I also like the lines of the 'Sussex' fitting which is a recent addition to the Harris and Sheldon range, whilst Atlas have used the same rather austere approach in making additions to their range of 'Wafer' fluorescent fittings, using a neat metal frame which is slotted at the sides to give sparkle. The simplest design of all is probably the SLR fitting DP14 with an extended plastic diffuser, which can be made available up to 16 ft long, housing either two 8-ft tubes or single 4-ft tubes.

It is this sort of extended fitting that leads us to think of lighted features. The luminous ceiling is still very much to the fore even though it is not always successful—at least in my opinion. For instance, quite a number of motor-car showrooms in London have adopted a completely luminous ceiling, and whilst this certainly makes the showroom conspicuous it seems to do little for the cars themselves. A shining new motor-car is a piece of merchandise that lends itself to clever display methods, but when it is bathed in omnidirectional light whilst reflecting large areas of low brightness the car seems to lose any shapeliness it may have. Nevertheless, when areas of ceiling space can be associated with other kinds of lighting a good overall design can often result. We have seen some additions to the diffusing materials used for luminous ceilings and one of the things that caught my eye at the ASEE Exhibition was the Harris and Sheldon 'Circlgrid'. This is a panel 2 ft square, made from a pair of vacuum-formed sheets of p.v.c. sealed to a central membrane. The surface of the two outer sheets is formed in an all-over pattern of truncated cones and when the sheets are put together the bases of these cones coincide and are then sealed together and pierced, to form louver cells. The panel has excellent light-diffusing qualities and considerable structural strength.

We are beginning to learn that there is scope for lighting walls as well as ceilings, a device which was adopted by Atlas in lighting the offices of the Gulf Eastern Company, the additional lighting of the vertical surface helping the typists in a really functional way. As yet, however, the lighting of vertical surfaces is usually done for decorative purposes. Since the much-publicized sculpture mural in Castrol House there have been two further examples of this sort of thing, in both of which GEC were involved. In providing the lighting for London's new theatre, the Royalty in Kingsway, they have lit the Circle Bar using large Variform pendants and specially-designed satin brass cylinder fittings, and in addition they have lighted a stained glass mural from behind by incandescent lamps. The second example is in the fabulous (I think here the word is perhaps justified) showrooms where Sanderson's now display wall-papers and fabrics. Here again there is a stained glass mural lit from behind, this time by cold cathode tubing to simulate natural daylight. The lighting system was decided after considerable experimentation and it was first erected in the workshop of Patrick Reyntiens (who executed John Piper's design) so that he could complete the mural under the conditions in which it would finally be seen in the showrooms. Elsewhere in this same building there are many interesting lighting effects to be seen; in fact, it is almost a lighting showroom in itself. I was

interested to see that colour-matching tubes are used throughout. In view of the cold colour appearance of this source it was a bold decision, but the general atmosphere is helped by the incandescent lighting that is used in a supplementary way.

## Lighting for Selling and Lighting for Service

AS I LOOK AT OTHER NOTABLE lighting installations of 1960 I feel that I should apologize to my fellow provincials because so often I refer to lighting in London. This is partly because I happen to live in London, and partly because the capital city inevitably contains newsworthy subjects which tend to be noticed more than others. I should say at this point, however, that whenever I journey to the provinces I seem to encounter some really ambitious industrial lighting, and this is not so obvious in the London area.

In any case the newer ideas in lighting during this last year seem to be devoted mainly to installations in stores and shops, which perhaps indicates that the techniques and equipment used for lighting working areas have now achieved a measure of stability and that we cannot expect noticeable changes until something revolutionary comes along.

Yet we are not really very inventive in our display lighting, as was demonstrated by the exhibition of 'French Elegance' in London. This exhibition was set in a completely black interior, most of the lighting being accomplished by ultra-violet lamps and baby mirror spots on switching cycles. In addition there were suspended glass bubbles reflecting colour-change lighting, and the edge-lighting principle used very cleverly in formal glass pyramids mounted as 'stalagmites and stalactites'. The whole thing may sound rather crazy; in fact, it *did* sound crazy, as the display was accompanied by *musique concret*, and I must admit that the *son et lumière* were so obtrusive and interesting that the articles on show became rather insignificant.

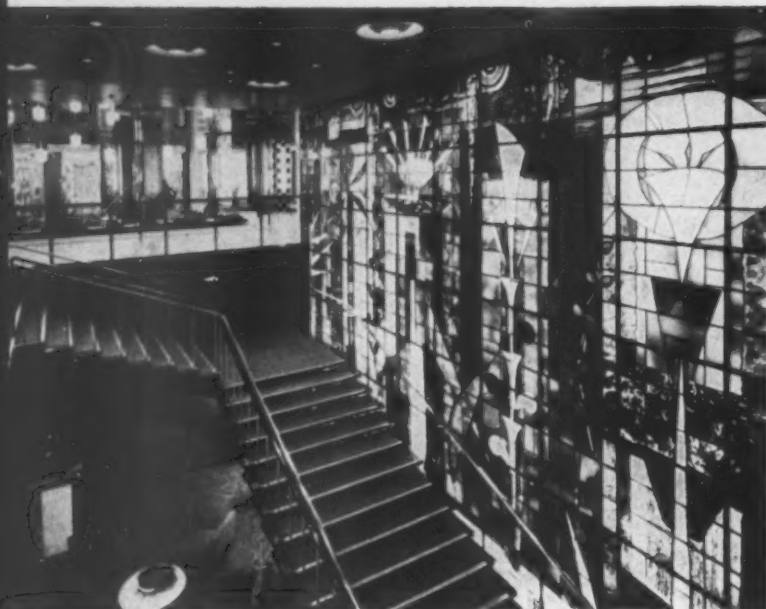
We display our British elegance in different ways. Peter Robinson's windows in the Strand use only incandescent spotlights and though this does not appear to be equally successful for all displays, it does emphasize how effective strongly directional lighting can be in display work. The reconstructed Austin Reed showroom in Regent Street is nicely lit and has one device that particularly appealed to me—a glazed lift shaft which, when internally illuminated, lights the stairs very effectively.

John Lewis's, in their new Oxford Street extension, have solved the colour-rendering problem by using fittings with both fluorescent and incandescent lamps. Colour-rendering certainly appears to be good, but the overall effect of a completely regular array of fittings over a large area suggests that Lewis's are only asking of their lighting installation that it should produce  $x$  lumens per square foot; surely lighting can do more than this in a selling area?

There are a number of other approaches to the colour-rendering problem, but you may be surprised to see the illustration of one of the new supermarkets lit by the old-fashioned incandescent lamp; a really determined approach. I learn from Holophane, whose 'In-built' prismatic fittings were used, that the illumination level is of the order of 50–60 lm/ft<sup>2</sup>. In contrast is shown an installation of Atlas 'Domino' fittings using the de luxe natural tube to get good

Fluorescent lighting afloat: AEI hot cathode fittings in the cabin class restaurant of RMS 'Amazon'.





1, Murals are growing in popularity—this is the Piper-Reyntiens design in Sanderson's new showroom, illuminated from behind by cold cathode fluorescent lamps. 2, Also from Sandersons, the 123-ft long fitting over the wallpaper viewing desks. 3, Wall lighting incorporated in the installation for the Gulf Eastern Co. 4, Circle bar in the new Royalty Theatre in London. (Photos: 1, 2 and 4, GEC; photo 3, Atlas.)

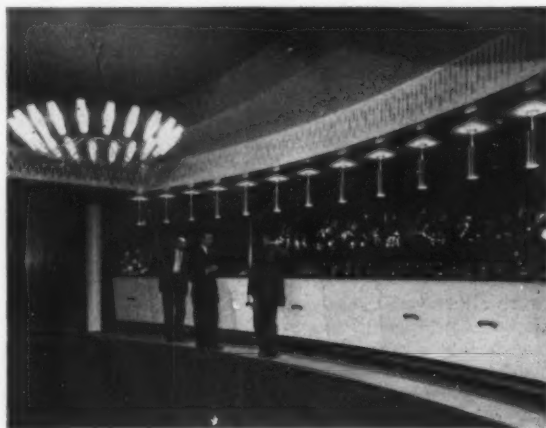
colour-rendering at a level of up to 120 lm/ft<sup>2</sup> in a Nottingham store.

The de luxe natural tube was also used for lighting the pictures at the National Portrait Gallery during a special Charles II Exhibition. The renewed interest in fluorescent lighting for picture galleries is leading to a good deal of work on the structural problems involved, and perhaps with the Guggenheim Museum as an example we may yet see some really dramatic picture lighting, at least in any new galleries that are built.

I was interested to call at the Marble Arch Post Office to see the counter lighting which has been designed by the GPO in consultation with Harris and Sheldon. The lighting consists of a number of boxes suspended from trunking, each box containing a 2-ft, 40w and a 4-ft, 40w fluorescent tube, the inside of the box carrying 'Paragrid-tile' polystyrene louvers to allow light to fall on the counter below. The front of the box is a glass panel in which coloured gelatines and stencils are so arranged that when the post is manned a luminous legend appears. When the post is not manned the panel appears a uniform black—so you know you needn't wait.

One of the most effective installations I have seen in recent months is the lending section of the new Holborn Library, where Merchant Adventurers have used their 'Ellipse' fitting in a very graceful formation to supplement the fluorescent lighting built into each book-rack. The upward component of the fluorescent lighting is well distributed across a high ceiling and when the incandescent fittings are seen against this ceiling a very pleasing brightness pattern is created. I think I reported on the advent of the 'Ellipse' fitting last year and I am pleased to see that another Merchant Adventurers' fitting which I praised, the 'Lightline', is also used in this library for the local lighting of reading tables in the reference section.

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Light, airy interiors are characteristic of modern stores, whether supermarket, self-service or plain old-fashioned assistant-service: 1, Atlas 'Domino' fittings used with de luxe natural fluorescent lamps in Burton's grocery, Nottingham; 2, Holophane prismatic fittings with incandescent lamps in a supermarket; 3, Crompton recessed modular fluorescent fittings in a new shop of W. H. Smith's, the stationers and booksellers.

Another impressive installation is that carried out by Troughton and Young at the Carpenters' Hall where the general lighting is by 300w incandescent lamps deeply recessed into cells in the ceiling, and a reflecting system based on the American Rambusch system is used.

Before we leave interiors and move out of doors perhaps we could look at an unusual Philips installation for Van Den Berghs and Jurgens Ltd at Bromborough Port. This lighting was designed to simulate as far as possible the daylight appearance of the interior. The building has a half glazed saw-tooth roof and continuous lines of reflector fluorescent tubes have been mounted as shown on the front cover, the upper tubes being beamed upwards to light the ceiling panels, and the lower tubes beamed downwards to provide direct lighting on the floor.

## Public Lighting and Public Opinion

WHEN WE MOVE OUT OF DOORS to review 1960 our first thought must be for street lighting, and let me record with pleasure still further signs of co-operation between local authorities. After the formation of the London Consultative Committee I now hear that there is a similar committee operating in South-East Lancashire and another is in course of formation in the West Riding of Yorkshire.

There have been no radical developments in street lighting equipment—certainly nothing to compare with the arrival of the 200w sodium lamp last year—though there is now some interest in designing lanterns with a low angle of distribution for use with this lamp.

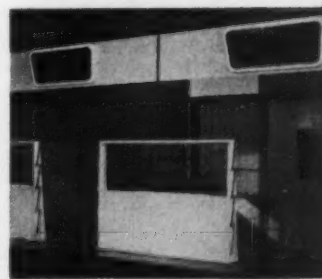
There is an increasing interest in aluminium alloy columns and we are now seeing more lanterns, floodlights and even column bases, made from glass fibre. Apparently there is still a good deal of public concern—at least amongst the more articulate people—

about the appearance of street lighting equipment, and no doubt many people in the lighting industry read with some amusement a letter in the *Daily Telegraph* a few weeks ago from a man in Manitoba who advocated that we should do what they do in his country—adapt the gas lamps for an electric source—as if that was a new idea! He might, however, be comforted if he could see a comprehensive exhibition of modern British street lighting equipment which now includes one or two rather nice 'electric versions' of the old gas lamps for residential roads. No doubt these will please Sir Basil Spence and Professor Richardson—would that 'Mattie' had lived to see the day! One of these lanterns is the nicely designed Revo Eastbourne lantern, intended for use with the colour-corrected mercury lamp. Another Revo post-top lantern, this time, for sodium lamps, does not have the same visual appeal; the refractor system suggests that the designer has been intent on efficiency and apparently does not agree with those who suggest that light distribution is not of great importance in Group B lanterns.

A Group B lantern also figured in a *cause célèbre* during the year, when an irate Chelsea resident objected to a fluorescent lantern that appeared one day outside her bedroom window. I am not sure now what the final result of the court case was, but I know that I felt a certain amount of sympathy with both sides.

In my last review I bemoaned the fact that the whiplash street lighting column had not yet found acceptance in this country. A few weeks ago I was interested to find an installation of this kind of column on the outskirts of Hamburg, using a cut-off lantern similar to one or two designs being used here at the moment for the colour-corrected mercury lamp. The installation looked really elegant in daylight but I was naturally anxious to find out what lamp was being used. I was therefore quite surprised

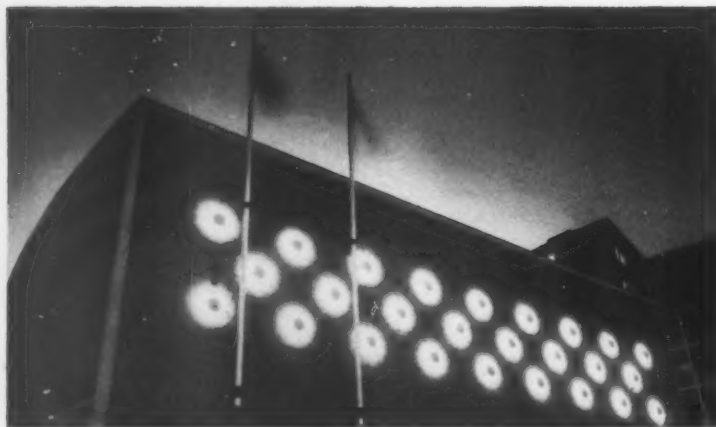
New look for Post Offices: Harris and Sheldon's modern counter lighting at Marble Arch.







Above, the use of Merchant Adventurers' 'Ellipse' fittings in the new Holborn library to make an unusual visual feature; right, Troughton and Young's lighting without lighting fittings, from recessed filament lamps, at Carpenters' Hall.



Pattern of light transforms an otherwise dull brick wall: Revo 'Halo' fittings on the flank wall of the scenery block at the BBC Television Centre.

on looking up into the lantern to see a neat row of about ten gas mantles. Must I look to the British gas industry to introduce the whiplash column here?

An unusual lantern intended for wall-mounting has been produced by Holophane. This is the 'Hastings' lantern designed for use in narrow thoroughfares and accommodating either 250w or 400w colour-corrected mercury lamps. This lantern could undoubtedly be useful in those streets where there is difficulty in siting columns in narrow pavements or where orthodox lanterns may be aesthetically unsuitable. Another wall-mounting lantern for

a more specialized application is a semi-recessed refractor lantern for 60w sodium lamps designed by AEI for the Hook underpass on the Portsmouth Road.

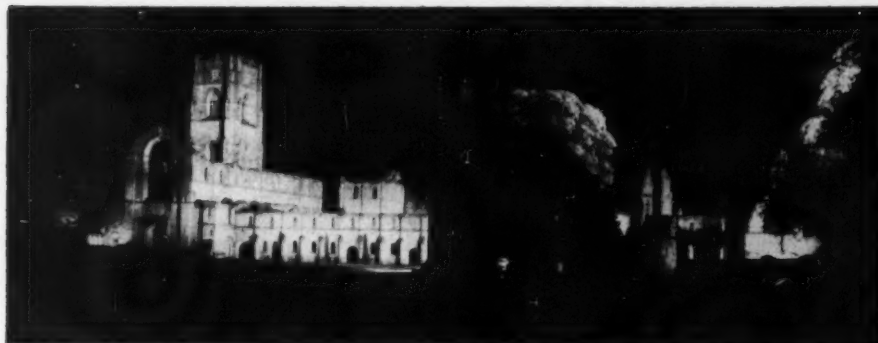
And now . . . back again to glare; for glare still continues to assault the motorist. If he happens to be on the M1 he will, in the absence of street lighting, suffer glare from his fellow-motorists travelling in the opposite direction; but at least he will be protected on bends by the screens which have been erected on the central reservation. As time goes on perhaps he will suffer less as all cars become equipped with sealed beam headlights now made in Britain. In town centres, he suffers glare from a plethora of advertisement signs—a growing problem that will have to be tackled sooner or later if motorists are to respond to traffic signals and other essential road signs. Far more often, however, the glare is from the street lighting itself and here we find a significant difference between lighting practice in this country and lighting practice on the Continent. The Continentals are very concerned to reduce glare in street lighting but seem to be much less sensitive to glare in interiors. We in Great Britain, on the other hand, are perhaps over-concerned about glare in interiors and not sufficiently about glare in street lighting. I realize that the reduction of glare would demand a move towards cut-off lighting and that this may involve reduced spacing/height ratios, and therefore more money, but in these days when we have 'never had it so good' a greater expenditure on street lighting seems to me to be long overdue.

We are, of course, seeing a few ambitious street lighting installations and I was particularly interested in the lighting of the Birmingham Ring Road using GEC post-top lanterns mounted at 30 ft, each housing three 400w colour-corrected mercury lamps. As these sources are used in an opposite formation at intervals of 100 ft it will readily be seen that this is an installation that goes well beyond the Code of Practice. These ambitious installations are still rare though perhaps new methods of salesmanship could be adopted such as that used by AEI (Woolwich) who 'sold' street lighting ideas to the Borough of Barry in South Wales by constructing an illuminated model of the town.

It is not only the traveller by road, however, who is helped by the endeavours of the lighting industry. The railways have in recent years been adopting much more outdoor lighting, a recent example being the Temple Mills marshalling yards at Stratford where over 200 GEC cut-off lanterns with 400w colour-corrected mercury lamps are mounted in clusters on floodlighting towers.

Whilst still out of doors let us look at the lighting which helps us to enjoy ourselves. Last year I wondered if it was really necessary to go 200 ft up in the air to put lumens on to a football ground, so naturally I was interested in the new GEC installation for Bromley Football Club which uses thirty-two 2,000w horizontally burning tubular filament lamps mounted in clusters of four on eight 40-ft towers, four on each side of the pitch. I am sure that this arrangement was not adopted because the GEC or Bromley had read last year's Random Review, but probably because Bromley just could not afford to go 200 ft up in the air. But if an adequate job can be done from such angles for a smaller ground, why not for a larger ground? After all, Arsenal are still content with an installation at Highbury using lamps





Fountains Abbey, an installation of mixed tungsten and fluorescent floodlighting specially commissioned for the IES Summer Meeting.

under the eaves of the two stands, and a few years ago I watched a match at Ibrox Park in Glasgow where a similar system uses a mixture of incandescent and mercury lamps to good effect. Moreover, the well-publicized installation of 'Infranor' projectors at the Barcelona Stadium also uses relatively low angle projection. So are these high towers really necessary?

And now to another of my hobby horses—floodlighting in London. This is soon dealt with, because I must record with deep regret that there was apparently no notable addition to floodlighting in London during 1960. There were, of course, one or two temporary displays: the Ministry of Works did some interesting lighting along the Mall for the Royal Wedding and perhaps one of the best lighting shows of the year was the firework display seen in St James's Park during the visit of General de Gaulle—though this is not something for which the lighting industry could claim any credit, and in fact any lighting people who saw this event on television may have felt a little depressed when Richard Dimbleby described the floodlit Buckingham Palace as looking 'rather like cardboard'.

Of course, a number of the new buildings in London are using lighting associated with external 'features'; there are, for instance, special effects in the garden court of the Sanderson building and the new BBC Television Centre also uses some feature lighting.

To put London to shame, however, there has been some good floodlighting in the provinces, including the most successful display at Fountains Abbey in connection with the IES Summer Meeting. Perhaps in these days people are more prepared to accept

dramatic lighting, and they are certainly far more interested in colour. Because of this the Fountains Abbey installation pleased most people, but I am sure it would not have been so acceptable, say, ten years ago. As it was, however, congratulations are due to Wesley Peirce and Charlie Passmore for a magnificent piece of planning and to the industry for co-operating so nobly. Another unusual piece of floodlighting was carried out by the GEC for Mont Orgueil Castle in Jersey, using four carbon arc projectors to replace a temporary installation which had used captured German anti-aircraft searchlights.

In Great Britain, apparently, we cannot have *son et lumière* without *pluie*. In the horrible summer of 1958 we had major performances at Greenwich, Cardiff and Gloucester. In the glorious summer of 1959 there was no major performance anywhere in the country. In the persistent rain of 1960 the Gloucester performance was repeated, and there were new shows for HMS *Victory* at Portsmouth and at Norwich Cathedral. The two new shows both had novel features. The *Victory* was an unusual subject and the lighting of rigging would probably have been impossible without narrow beam low voltage spotlights. There were also some inevitable limitations on those concerned with technicalities, one being that the producer had to try to stage the Battle of Trafalgar without smoke!

At Norwich, Atlas were able to use their 'Aurama' technique so that all the lighting effects were controlled automatically from the sound track. Here there was a good script (containing some really successful humour), some good acting and a beautiful subject; you only needed good weather for full enjoyment—and I don't need to tell you what the

Streetlighting levels are still climbing: above, the Birmingham Inner Ring Road installation at 30-ft mounting height, providing 30,000 lm/100 ft linear; below, a transition between old (400w mercury) and new (200w sodium linear) at Middleton.



Football by floodlight: Bromley Football Club's installation of 40-ft towers is seen to be as effective as high-level lighting.





Lighting used to conceal and reveal in the play 'Oliver', enabling the basic stage setting to remain virtually unchanged throughout. As will be realized, the three scenes above, 'London Bridge' (top), 'The Workhouse' (centre) and 'The Three Cripples' (bottom) differ only in the relative position of the central setpiece (which is erected on a rotating section) and in the use of readily movable properties. The stage lighting is wholly directional, carefully controlled to illuminate only those parts of the set of interest to the plot in that scene, the remainder being hidden in darkness.

weather was like. The Borough of Croydon celebrated 1,000 years of history in a safe and sensible way by staging their 'Aurama' display inside the Parish Church.

### Lighting Lectures

LAST YEAR I ENDED RANDOM REVIEW with a solemn peroration dealing with the subject of education and regretting the lack of facilities, particularly in provincial areas. This year I can end on the same subject, but fortunately on a more cheerful note. During 1960 leading manufacturers have been in consultation with the IES Education Committee to see what measures can be taken to help the general cause, and various practical measures are being considered to assist those students in the provinces who have to study lighting engineering by correspondence or by private reading. It is hoped that a short practical course may be arranged during this coming year, and I am sure that the organizers will hope that employers will release students to attend it; for it would not only be of benefit to the student and his employer, but surely to the progress of the whole industry.

It is pleasing also to be able to report on educational progress at a more advanced level. The technicalities of lighting engineering are moving on apace, and there are many aspects of the subject which are not yet absorbed into the recognized course in illuminating engineering, nor even fully covered in the available literature. It is in such a situation that short courses of lectures by specialists can be of great value. One of these courses was held at the Battersea College of Advanced Technology early this year and it attracted not only lighting engineers, but also a significant representation from users of lighting. At the time of writing this Review, an even more ambitious course is being held at the Northampton College of Advanced Technology in London, which has attracted more than seventy students to a series of six lectures.

Whilst the technicalities of lighting are becoming more complicated, the artistry of lighting grows in importance. This aspect of lighting is not covered by the syllabus for the City and Guilds Certificates in Illuminating Engineering, and there are those who think that these artistic matters could not be included in a technological course. There are a few who would go even further and say that the artistic side of lighting cannot be taught at all. My own feeling is that we shall not know until we have tried it, and I am hopeful that before long we shall hear something about an experiment on these lines.

But education of the student is not all; the public must be educated as well, and I am glad to say that 1960 has seen an increase in the number of lighting articles published in the press and in trade journals. I imagine that most of these articles were 'inspired', for it is nice to see that the technical gaffes we often saw some years ago rarely appear today. We may see the hand of B.L.C. in this, for the Council has had a busy year in many directions and is at the moment engaged on an ambitious series of promotional conferences in many parts of the country.

It seems, therefore, that the industry has been looking after its own destiny during 1960, both in educating its future workers and in promoting its future business. The immediate events of 1960, however, have not really been dramatic and although we have seen interesting projects and interesting installations no one has been wildly enterprising—except, of course, the glow-worms.

# Sketchbook in Milan

By R. L. C. Tate

I FIRST VISITED MILAN on my way home from the army in Naples. My stay was brief, and sightseeing naturally limited to a quick visit to the cathedral (internally even darker than usual owing to all the windows being blacked out), and an unsuccessful attempt to see Leonardo's 'Last Supper', then screened by a vast tarpaulin from a room filled with dust and rubble. Dust and rubble were perhaps the salient features of the city then, and my last impression was of the ornate marble splendours of the railway station rising among the wreckage of less splendid but equally solid Victorian masonry, and of a long line of officers and 'other ranks' humping their kit across a rain-swept square.

This year the rain was still there but, in place of the rubble, the Central Station, still looking like a cross between Selfridges and a Roman bath, has been dwarfed by a veritable thicket of skyscrapers, of which the nearest and by far the most elegant is the Pirelli Centre. Low by New York standards (a mere thirty-two stories above ground), it is still the most dominant feature of the landscape, and its sweeping elliptical lines suggest those of a great ship riding above the roofs. It is approached over a monumental plinth, two storeys high, by steps covered with the company's non-skid rubber tiles. At the top of these steps glass doors lead into the enormous, airy entrance hall spanning the full width between the giant pillars supporting the main structure.

The ceiling of this room consists of tapered areas of acoustic tiling set between prestressed concrete beams span-

ning its whole length and splaying out at the end walls. Lighting is from coves made on the periphery of these ceiling panels, except in the case of the central members, where recessed fittings using 'Perspex' diffusers have been used. The effect is soft and unobtrusive and helps to underline the complete integration of structure and decoration at this level (fig. 1).

The visual tasks performed in an entrance-hall are not very critical, however, and the level of illumination is fairly low: in the sub-basement a huge room full of electrical computers is given a simple industrial treatment which is equally effective. Here the great concrete beams spring from the walls and form a trellis pattern, like the ribs of some enormous Gothic vault. Acoustic ceiling panels are dropped in the 'liernes', but the lighting is provided by continuous lines of fluorescent lamps in sheet-steel troughs suspended by chains from the ceiling. These troughs are no more than baffles, open top and bottom, and provide first-class illumination without the fussy effect that would result from the usual forest of industrial fittings (fig. 2).

There is a post office in the building with a most interesting system of departmental lifts. Here I sketched a conventional 4-ft fitting with a most ingenious spring-loaded metal end-plate (fig. 3). This, certainly, was a neat solution to the problem of how to finish a fluorescent fitting.

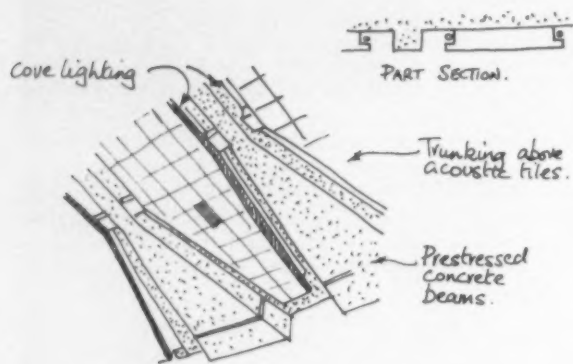
At Pirelli, the built-in lighting really seems part of the structure; at Olivetti it gives the impression of being little more than an afterthought, bearing no relation to the enclosing beams. A conventional type of louvered luminous ceiling is used on the ground floor, but the plenum depth is inadequate and maintenance seems deplorably bad. The white plastics louvers were a uniform grey, many lamps above them were out or merely glowing at the ends and the whole effect was of neglect—contrasting oddly with the polished metal and marble of the walls and furniture. The indirect trough in the board-room (fig. 4) has a slightly 'jazz age' flavour. I could not for the life of me conceive why it had that queer little T-shaped appendix. I liked better a small rise and fall fitting seen in the showroom (fig. 5).

Much has been written already about lighting at the XII Triennale (see *LIGHT AND LIGHTING*, October 1960) and I do not intend to duplicate it here. It is worth noting, however, that the eyeball fittings in the Swedish section (fig. 6) were made of mirrored glass instead of the conventional spun metal, and that the table glass in the same pavilion was shown against a 'Perspex' panel illuminated by tungsten



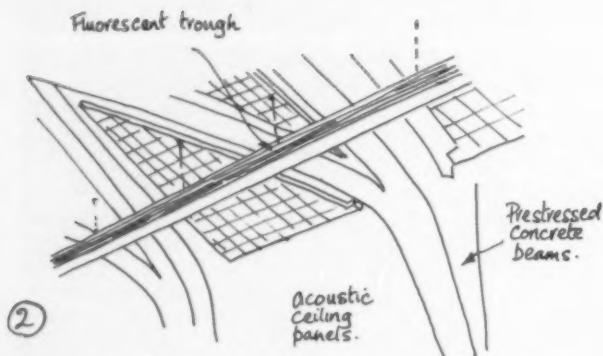
The 32-storey tower of the Pirelli Centre in the Quartiere Dirizionale, Milan. Photographs of the interior of this outstanding building are reproduced on pages 20 and 21. (At the top of the page, luminous ceiling in entrance to La Rinascente.)

lamps instead of the usual fluorescent—a white wall helping to diffuse the light very effectively. A floor standard in the French section made original use of an opal-glass shade, a truncated cone in shape, inverted on a rosewood standard, but like so many French articles, the finish was poor. The little desk-lamp in the Mexican section (fig. 7) is interesting because of the use of glass-fibre for its diffuser. This material was also used for the windows of the prefabricated school in which the desk appeared; they were decorated with black line drawings and had something of the effect of thirteenth-century *grisaille* glass.

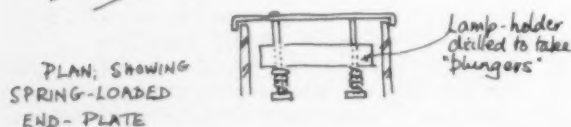
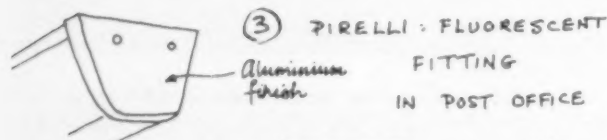


① PIRELLI: DETAIL OF CEILING ON MAIN FLOOR.

Note: The central member has no cove lighting but houses twin-lamp recessed fluorescent fittings with "Perspex" diffusers.

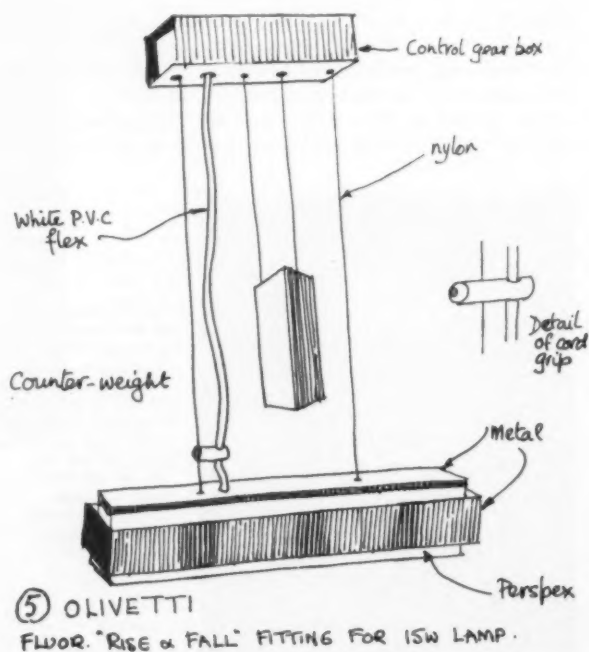
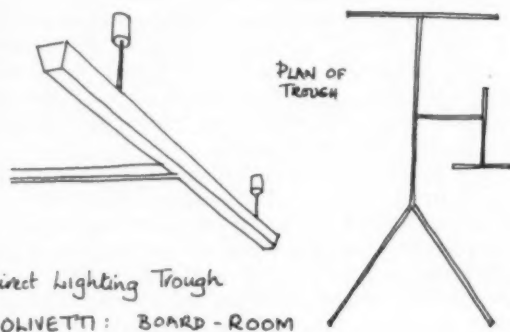


② PIRELLI: DETAIL OF SUB-BASEMENT CEILING.

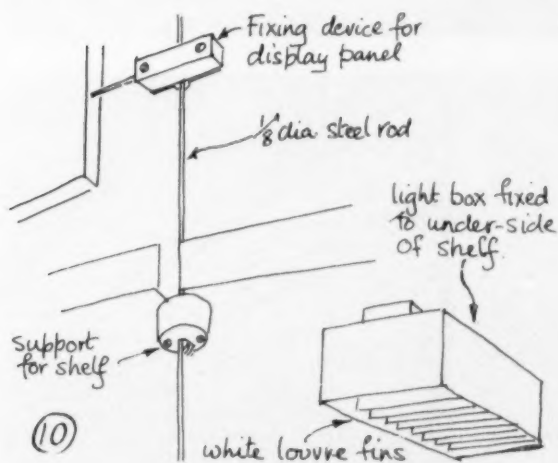
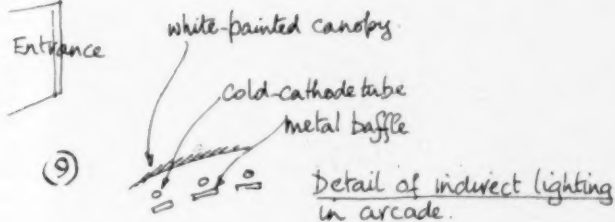
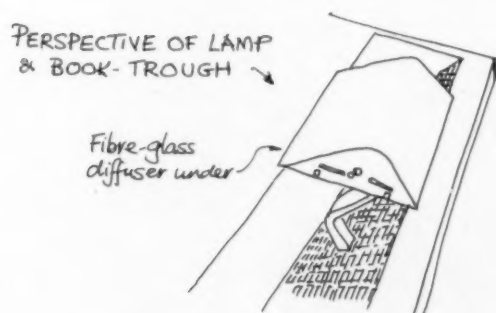
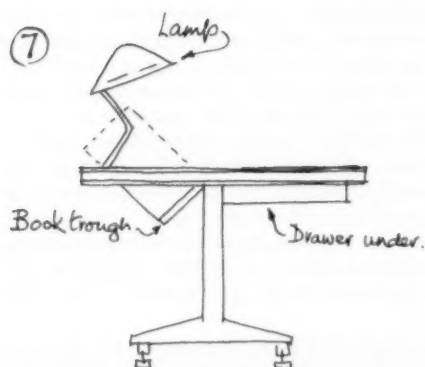
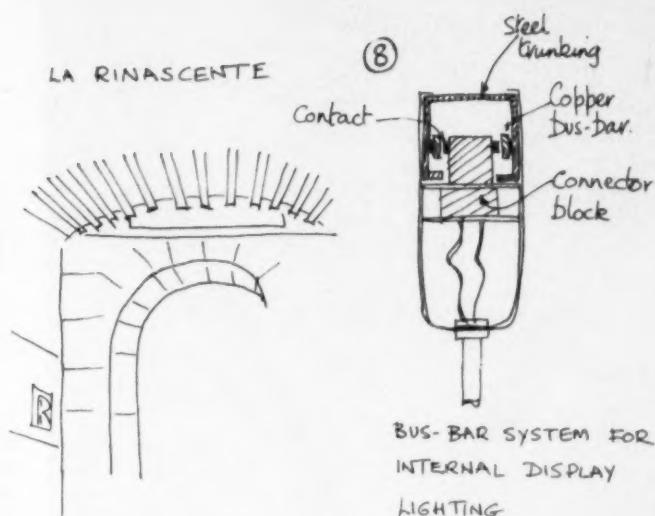
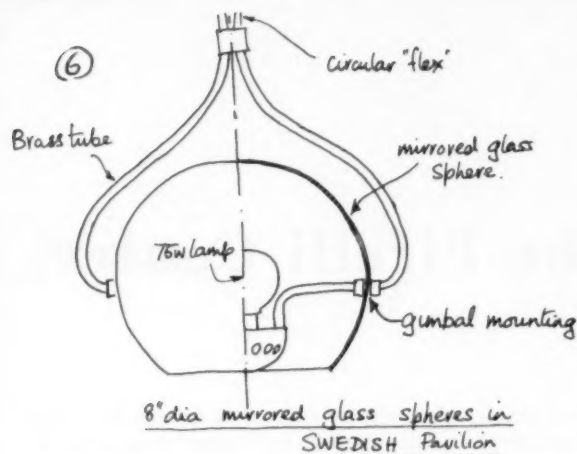


Near the cathedral is La Rinascenti, a large store somewhat after the style of Selfridges. Here again a luminous ceiling (this time of corrugated vinyl) showed the appalling effect of bad maintenance, but quite the most interesting lighting feature was the bus-bar system carrying mains-voltage reflector lamps on the ceilings of the third and fourth floors (fig. 8). This system, which would scarcely pass the 'IEE regs', I am afraid, was used not only for spotlighting counter displays, but also to feed displays of lighted wall brackets mounted on pegboard screens.

The shop windows of La Rinascenti are protected by a stone arcade (part of the Mengoni arcading that flanks the Piazza del Duomo), and very useful this arcade is in Milan's by-no-means Italian climate. The ceiling of the arcade is lit by a simple system of baffles concealing cold-cathode tubes (fig. 9). There are two storeys of windows, the upper lines lit only by fluorescent lamps, the lower ones mainly by tungsten filament lamps. One window displaying fashion goods had supplementary lighting from a line of fluorescent lamps mounted behind a 6-in. wide baffle just behind the glass at waist level. Where reflector lamps are used they are mostly of







the conventional type, but I saw examples of the pressed-glass lamp, as well as of low-voltage miniature reflector lamps and of the horizontally-mounted reflector-lamps designed for cornice lighting. This type of lamp was used also for lighting parts of the Austrian pavilion at the Triennale.

Also at the Triennale I found some neat German shelving, reminiscent of that used in their pavilion at the Brussels Exhibition, where local lighting was from pairs of single-ended tubular lamps in small black metal boxes with white metal louvers. The suspension of the shelves was unusually elegant (fig. 10).

Perhaps the most daunting thing about lighting in Italy is the almost incredibly clumsy design of some of the local domestic fittings, and for real horror, some of those at the airport would take some beating. A clumsy twin-lamp fluorescent fitting made up of ill-fitting sections of polystyrene was accompanied by a number of opal spheres, suspended by bare conductors and housing, of all things, fluorescent-bulb mercury lamps which cast an eerie light on the booking hall and made even more nightmarish the atmosphere of those seemingly interminable delays which seem to be an inescapable part of night-time air travel.

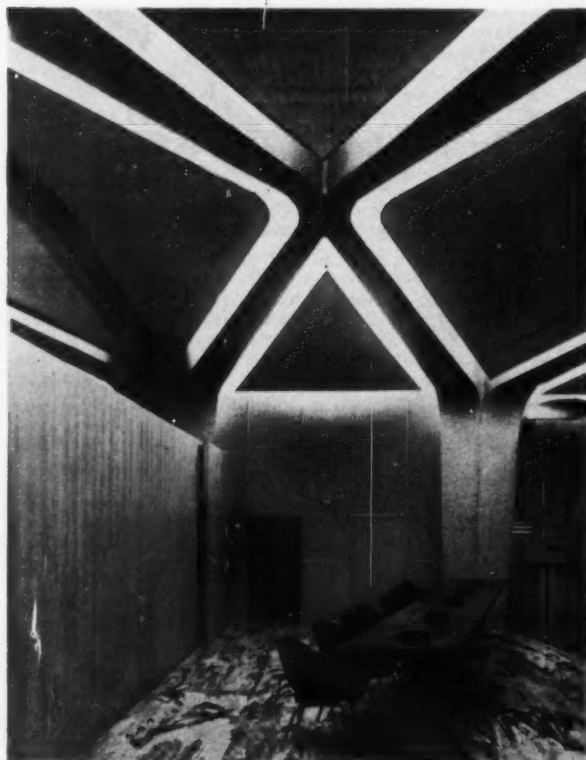
## The Pirelli Centre,

MILAN'S NEWEST AND TALLEST SKYSCRAPER, the Pirelli Centre is a spectacular building and a convincing example of the value of complete co-operation between architect and engineer. Like Mies van der Rohe's Seagram Building in New York, it achieves its effect by the severe austerity of its lines, and the complete integration of structure and visual form. Like the Seagram Building, too, enormous care has been taken over such details as door furniture, wall surfaces and other decorative features. An example of this is to be found in the doors to the parcels room in the basement, the backs of which are finished in the same ribbed-pattern aluminium and hardened rubber as the fronts. While Mies's building thrusts a long black box into the sky, however, Ponti and Nervi have produced a more subtle shape, tapering at each end of the plan into two vast concrete slabs which almost meet, but expose a ladder of viewing balconies between them. The building comprises a tower, 415 ft high, carried entirely by four reinforced concrete shafts that house services, lifts,



## Milan

air-conditioning ducts and emergency staircases (forming solid portions at the ends of main façades) and by two pairs of deep columns providing lateral stiffening designed to withstand a wind intensity of 150 km/hr on the 10,000 sq. m. façade. The building is designed to house a staff of 2,000; there are twelve lifts; two basements (one housing a computer centre) and a conference hall; while much use has been made of Pirelli's own products for the finishes and services of the building—e.g. for floorings, wall surfaces, air-conditioning ducts and acoustic panelling. Seen in the photographs are the following areas: Opposite page, top, the roof of the building, looking towards the viewing balcony. This area houses a transmitting station for Milan airport and is also to be used as a meteorological station. Opposite page, bottom, the main entrance hall. This page, top, the 600-seat basement auditorium; bottom left, part of this same auditorium, showing the roof structure; bottom right, computer centre (also in basement), situated under the forecourt car park.



For lighting details, see 'Sketchbook in Milan' (pp. 17-19).

# LIGHTING ABSTRACTS

## OPTICS AND PHOTOMETRY

628.93

906. Universal diagram for representation of light distributions of unsymmetrical sources.

J. DOURGNON and D. FLEURY, *Lux*, 53-68 (March 1960).  
In French.

A new plotting web is proposed for the recording of asymmetrical light distributions, especially adapted for street lighting. The flux can be calculated by the methods of either Gauss or Tehebicheff by summations of intensities at sets of chosen co-ordinates; several examples are given. Master webs give the relation of the proposed co-ordinates with other more familiar systems, and the set permits readily the plotting of the distribution when rotated by known amounts about any of the usual axes.

J. M. W.

535.24

907. Recommended light characteristics of acrylic used in illumination.

*Illum. Engng.*, 55, 450-452 (August 1960).

Prepared by the Light Control and Equipment Design Committee of the American IES, this report, similar to an earlier one dealing with polystyrene (Abstract No. 614), gives recommendations on the physical and mechanical requirements for test specimens of acrylic sheet and on the acceptable figures for colour stability, refractive index and light transmission, the testing procedures being those specified by the American Society for Testing Materials.

P. P.

908. White light—what is it? 612.843.31

R. G. WILLIAMS, *Illum. Engng.*, 55, 431-434 (August 1960).

The elementary theory of spectral colours and their perception by the trichromatic theory of colour vision are described to illustrate the variable nature of 'white' light. Methods for varying the spectral distribution of white light include the use of colour filters, the blending of more than one type of white illuminant, the varying of the supply voltage of an incandescent lamp and the additive mixing of certain basic colours in different proportions. By introducing simultaneous contrast, white light can be made to appear to take on a pronounced colour appearance. A new type of remotely-controlled rectifier-type dimmer is described which facilitates some of the methods for varying the whiteness of the light.

P. P.

909. Significance of numerical results of photometry. 535.241

E. H. SALTER, *Illum. Engng.*, 55, 560-564 (October 1960).

There is a tendency, particularly where modern computer techniques are available, to express photometric test results to more significant figures than are justified by the accuracy of measurement, particularly where only one sample of a luminaire is available for test purposes. The point is emphasized by tables of photometric data on incandescent and fluorescent lamps and luminaires. Imprecise lamp location and small differences in reflector shape, dimensions and reflection characteristics all contribute to the variability between the readings. These variations are reflected in the accuracy of coefficients of utilization and other parameters used in lighting design calculations, such that differences of one or two points in the second figure of such coefficients may or may not be significant.

P. P.

910. Spectral distributions of daylight or artificial light. 535.33

ANON, *Ljuskultur*, 32, 136 (No. 3, 1960). In Swedish.

The proportions of radiation emitted in each of eight spectral bands by different light sources are tabulated. These sources include the new red-rich 'de-luxe' type lamps.

R. G. H.

## LAMPS AND FITTINGS

628.971.6

911. Lamp lighting, street furniture and street lighting.

J. T. GRUNDY, *Public Lighting*, 25, 164-176 (September 1960).  
The history and the evolution of the design of street lighting

lamps over the past thirty years is described with illustrations of past and present practice. The almost universal use of metallic alloys and plastics in modern lanterns have eased the designers' problems of overall weight. The tendency over the years is towards more pleasing outlines coupled with greater efficiency. Examples of practical co-operation between manufacturers and architects and civil engineers in the design of lanterns are quoted and in particular special fluorescent lanterns developed initially for use overseas. The author suggests the standardization of design in order that lanterns may be produced in quantities thus affording in use, efficiency in operation and reasonableness in price. Several useful charts and tables applicable to street lighting are included.

B. C. O.

## LIGHTING

628.971:628.971.6

912. Lighting of the through motorways and the open spaces of Orly Airport.

A. BUSSON, *Lux*, 105-117 (No. 8, 1960). In French.

The extensions to Orly Airport have necessitated the routing of the Orly spur of the southern motorway from Paris under certain of the new buildings and a runway in a series of underpasses. The problem of lighting the entries has been solved by the provision of entrance louvers, constructed of aluminium and inclined so that all direct sunlight is excluded. The underpasses are lighted with sodium lamps, the lighting being graded in zones. The principles of design of the louvers and the interior lighting are given in some detail, with the designed and the measured distribution of illumination both in the louvered sections by day and in the underpass proper. Some information is also given of the lighting of the vehicle parks at the airport, and of the aircraft aprons; the latter use projectors with high pressure mercury vapour lamps, using uncorrected lamps for the longer throws since their light can be better controlled and since the requirements for colour rendering are less stringent.

J. M. W.

913. The lighting of the southern motorway from Paris. 628.971.6

ANON, *Lux*, 123-124 (No. 8, 1960). In French.

Gives brief particulars of the installation characteristics of the lighting installation on the southern motorway from Paris, and of the electrical distribution arrangements. For comparison, the leading characteristics are also given for the earlier western motorway and for the Rotterdam-The Hague motorway, the lighting for which is just being installed. On the southern motorway, 400w, mhf lamps are used in reflector lanterns at a mounting height of 12 m and a spacing of 35 or 40 ft, giving an installed flux of 42 or 38 lm/m<sup>2</sup>; on the Rotterdam-The Hague motorway, 4-lamp 140w sodium lanterns are used at 12.5 m mounting height and 35 m spacing giving 96 lm/m<sup>2</sup> (installed flux).

J. M. W.

914. Lighting of the new NATO headquarters. 628.972

M. LASABATIE, *Lux*, 118-122 (No. 8, 1960). In French.

Describes the lighting systems in the new NATO headquarters including the offices, conference halls, council chamber, etc. The greater part is by indirect lighting with krypton filled tungsten filament lamps.

J. M. W.

628.972

915. Technical discussion sessions at the 1960 Summer Meeting.

*Trans. Illum. Eng. Soc. (London)*, 25, 139-147 (No. 3, 1960).

Informal sessions on: analysis of the visual task; luminance and glare; modelling and colour; industrial area floodlighting with particular reference to railway sidings; maintenance; lighting calculations, discussed at the IES Summer Meeting in May 1960 are reported upon by the chairmen of each of the sessions.

P. P.

916. Accent on art. 628.972

ANON, *Illum. Engng.*, 55, 443-449 (August 1960).

Wherever it is required to create a mood or induce an emotional response, whether in the home or in an office, church or restaurant, by means of lighting, then lighting design becomes essentially an art. This thesis is illustrated by numerous photographs of lighting installations in which particular psychological effects have been sought in the design.

P. P.



**917. Spotlight on science.**

628.972

ANON, *Illum. Engng.*, **55**, 437-442 (August 1960).

Illustrations of a number of new American lighting installations demonstrate how concern for the aesthetic effects of lighting, in combination with other characteristics such as illumination levels, luminance ratios, surface reflectances, etc., has resulted in psychological benefits being obtained in the lighting of a bank, offices, shops and factories.

P. P.

**918. New thoughts on lighting design.**

628.972

G. W. CLARK, *Illum. Engng.*, **55**, 416-420 (August 1960).

A successful lighting installation requires attention being paid to the psychological and aesthetic effects produced, as well as to such factors as illumination level, luminance distribution, reflections, shadows, etc. Satisfactory psychological and aesthetic effects are achieved by means of colour, arrangement of the luminaires and changes in the lighting pattern. The changes can be achieved by variations in the spectral quality of the light, in the appearance of the lighting system and in the level of illumination.

P. P.

**919. Lighting design—whose job?**

628.972

H. J. WALD, *Illum. Engng.*, **55**, 421-424 (August 1960).

A successful lighting design requires collaboration between the architect, interior designer, lighting and electrical engineers and equipment manufacturers. A proper understanding of each group's problems is required, but is rarely achieved because the specialized terminology of one group is incomprehensible to the others. Recommendations are made for the basic requirements of a satisfactory lighting education for architects. Because of a failure in communication, the recent recommendations for higher illumination levels have created confusion among American office property owners.

P. P.

**920. Bland environments.**

628.972

H. L. LOGAN, *Illum. Engng.*, **55**, 425-428 (August 1960).

Some present-day schools of thought foster a severe limitation on the luminance range in a lighted interior, producing a uniformity or 'blandness' which is claimed to be the most satisfactory for seeing purposes. Blandness, however, leads to monotony, and encourages illumination levels higher than are necessary for optimum seeing. Luminaires having a controlled downward distribution are inherently less glaring than ones having a uniformly diffusing distribution.

P. P.

**921. Idea for control of ceiling brightness.**

628.972

ANON, *Illum. Engng.*, **55**, 463-464 (September 1960).

A shop with a ceiling height of barely 10 ft created a problem in providing high illumination levels using extra-high output fluorescent lamps in indirect luminaires without producing excessive ceiling luminances. The solution was an abstract 'mural' on the ceiling above each luminaire, the colours of the mural being chosen to grade from low reflectances at the centre to high reflectances at the edge, so giving a more uniform and acceptable luminance pattern on the ceiling.

P. P.

**922. Deas Island tunnel.**

628.971

K. HASELSTEINER, *Illum. Engng.*, **55**, 467-468 (September 1960).

To cope with the problems of dark and light adaptation on entering and leaving a new tunnel under the Fraser River near Vancouver, 300 ft of louvers at the entrance and 180 ft at the exit provide for a gradual transition in illumination level capable of catering for car speeds of 60 mph and more. The louvers are inclined so as to prevent direct sunlight from reaching the roadway underneath. The illumination drops to 5 lm/ft<sup>2</sup> after complete adaptation to night driving, while photocell control caters for the day-night cycle.

P. P.

**923. Models for interior lighting schemes.**

628.977

R. SCHNEPPENDAH and W. WIECHOWSKI, *Lichttechnik*, **12**, 551-553 (October 1960). In German.

The use of models in the design of interior lighting has many advantages, so long as care is taken that the surfaces of the model are similar to those in the original building, particularly as regards their reflection characteristics. A large model, although more expensive, is usually quicker to make than a small one, which can give trouble in imitating the light output and distribution of the fittings. If the scale of the model is 1:m the light output must be

1/m<sup>2</sup>. The measurements, too, are more liable to error in a small model. Luminance has usually to be measured visually.

J. W. T. W.

628.921

**924. Different methods of measuring and planning daylight.**

J. WEGNER, *Lichttechnik*, **12**, 555-559 (October 1960). In German. Describes the principal methods used for evaluating daylight factors, including the internal reflected component. Those considered are Hopkinson's (as used by Vollmer and included in the German Standard DIN 5034), Büning's, Tonne's and the inter-reflection method used in America. Measurements made in eight typical rooms are compared with the values calculated by the different methods and it is found that the first gives the most accurate results. By an extension of this method and the use of two diagrams given in the paper it is possible to determine the height and width of window needed to provide a given daylight factor at any point in a room. The two diagrams have to be drawn on transparent material and superposed. With the window dimensions determined in this way the internal reflected component is one-half the total daylight factor.

J. W. T. W.

**925. Idea for altering apparent dimensions.**

628.972

ANON, *Illum. Engng.*, **55**, 525-526 (October 1960).

The 'tunnel' effect in a long, narrow bookshop (62 ft by 23 ft) has been minimized by introducing three luminous ceiling sections spanning the full width of the shop at a lower level than the main ceiling, so emphasizing the horizontal dimension of the shop. Hour-glass luminaires provide light in the high-ceilinged areas. Bookshelf arrangements in relation to the high and low level ceilings help to create the desired appearance.

P. P.

**926. Lighting—keyed to today's homes. Part 1.**

628.972

ANON, *Illum. Engng.*, **55**, 527-559 (October 1960).

Prepared by the Residence Lighting Committee of the American IES this semi-technical report intended for interior designers, architects and home lighting specialists replaces the 1950 non-technical report 'Contemporary lighting in modern and traditional materials'. This first part of the new report deals with window and wall lighting, cove lighting, recessed lighting, luminous ceilings and walls and light sources and shielding materials. Other parts of the report will appear in the journal's November and December issues.

P. P.

**927. Lighting of airport service areas.**

628.971

E. B. KARNS, *Illum. Engng.*, **55**, 565-568 (October 1960).

The application to a typical large airport of the American IES Recommended Practice for Airport Service Area Lighting (Abstract No. 895) is considered. The areas concerned are those where guidance for the pilot to the final taxiing position is required and where passengers embark and disembark, cargo is loaded and unloaded, and the aircraft is refuelled. Minimum requirements of 1 lm/ft<sup>2</sup> of horizontal illumination over the entire area for the benefit of the approaching pilot, together with 2 lm/ft<sup>2</sup> of vertical illuminating for aircraft servicing not involving fine visual acuity are advocated. Various layout schemes for realizing these recommendations are discussed.

P. P.

**928. Electric lighting in economy-type farm buildings.**K. JUNGHOLM, *Ljuskultur*, **32**, 147-156 (No. 3, 1960).

In Swedish.

The economical lighting of cowsheds is primarily a matter of careful placing of the simple fittings. Recommended levels of illumination (of the order of 2-6 lm/ft<sup>2</sup>) for different buildings are given, and suggested types of lamp and probable cost. There is an economic case for fluorescent lamps of the 'new white' type.

R. G. H.

**929. Lighting in mines.**S. RAHM, *Ljuskultur*, **32**, 123-120 (No. 3, 1960). In Swedish.

The theory and practice of mine lighting is discussed in detail. The eye requires up to 30 minutes to dark-adapt, of which the first three or four minutes produce a marked degree of adaptation. The danger of disabling glare from visible sources is always present in mines, and great advantages result from whitewashing the tunnel walls. The correct types of fitting to use in different parts of the mine are discussed. A plea is made to give the same emphasis on good colour rendering underground as in comparable work-areas on the surface.

R. G. H.

## NEW PRODUCTS

### Decorative filament lamps

THE CONTINENTAL DEVELOPMENT of large decorative bulbs for filament lamps, reported in our September 1960 issue, has been rapidly followed by a similar product in this country, produced by Philips. It is their 'Fantasie' lamp, available in two distinctively shaped bulbs of 'contemporary' style, having an 'Argenta' white finish and gold anodized cap extended to cover the upper 2 in. of the bulb. Both lamps, which are approximately 9 in. long overall, are made



These new 'Fantasie' lamps from Philips may be used without shades.

in 60w, normal voltage ratings and they may be used without shades; they retail at 12s. 6d. including tax. In contrast, the trend toward smaller bulb sizes continues, as shown in another recent development—Crompton's 'Newshape' lamps, which have the so-called mushroom bulb, coated internally with a diffusing medium to give virtually uniform surface brightness. They are made in 40w, 60w, 100w and 150w ratings for the usual mains voltages. The 150w lamp has a bulb size of 75 mm and overall length of 120 mm, while the other three are all 60 mm diameter and 105 mm long; retail prices are: 1s. 8½d. (40w and 60w), 1s. 11½d. (100w), 2s. 10d. (150w), including tax.

Philips Electrical Ltd, Century House, Shaftesbury Avenue, WC2.

Crompton Parkinson Ltd, Crompton House, Aldwych, WC2.

### Sealed-beam lamps for cars

COMMERCIAL AVAILABILITY of British sealed-beam headlamps for cars is another recent filament lamp development. Made by Sealed Beams Ltd, a joint venture of AEI, GEC and Lucas, the car accessory firm, this type of lamp is a standard fitting on all 1961 Vauxhall six-cylinder cars for the home market and is available from Mazda and Osram stockists for replacement and conversion purposes. Selling at 29s. 6d., the sealed-beam unit is about 11s. more expensive than the 7-in. reflector, lens and pre-focus lamp assembly that it replaces but has a number of advantages over that assembly. The filaments have a slightly higher power rating (60/45w as against 50/40w or 55/44w; the higher value in each case refers to the driving beam filament and the lower value to the meeting, or dipped, beam filament) and a greatly extended life (200 hr. and 300 hr. respectively, against 75 hr. and 100 hr.). Maintenance of light output through life is also improved.

This construction enables the filament to be mounted with a tolerance of less than 0.01 in. in relationship to the reflector and lens to give a more accurately controlled beam, affording less glare to oncoming drivers and better road illumination, with a greater range along the nearside kerb in the meeting beam.

Sealed Beams Ltd, Corby, Lincolnshire.

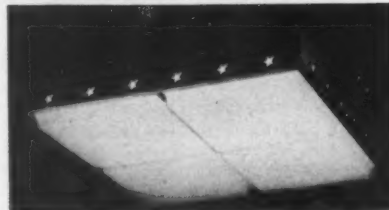
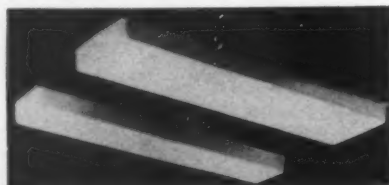
### P.V.C. finishes for materials

POLYVINYL CHLORIDE for use as a protective coating for a wide range of materials is now available from the Plasinter Co in three grades which permit spray-brushing, stoving and air drying. The coating is stated to adhere strongly to wood, brick, concrete, asbestos and all metals. The spray-stoving system MS/HC is designed to give a finish superior to normal stove-enamelling with similar coating thicknesses; the coating gives a hard, glossy, smooth surface with a vitreous-like finish and warm plastic feel, ideally suitable for indoor and outdoor use with good resistance to ageing and embrittlement. The spray-brush air drying system MS/AD is designed for articles which cannot be stoved; the finish has the same protective and other properties as MS/HC but gives an eggshell gloss surface. The third finish, the air drying system MM/AD, produces a tough coating with high resistance to acids and chemicals.

Plasinter Co Ltd, Holyhead Road, Wednesbury, Staffs.

### Fluorescent fittings from Italy

ITALIAN INFLUENCE IN THIS COUNTRY is already established in a number of spheres, notably clothing and motor-cars, and that it may be growing in lighting fittings is a possible deduction from the marketing in Britain by Lumitron Ltd of a range of fluorescent fittings of Italian origin. There is a wide variety of designs for commercial



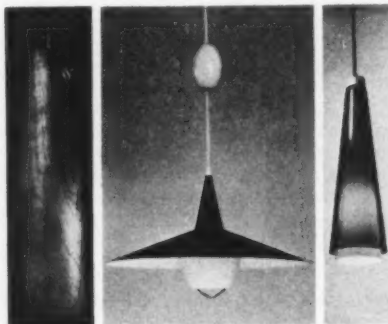
Two of the range of Italian fittings available from Lumitron: top, the Lido 34 and bottom, the San Remo 42.

application, ranging from the generously decorated to the more simple styles which appear to be currently popular in this country. Of the latter, a notable unit is the San Remo 42, a square-framed suspended fitting for four 2-ft, 20w tubes, with light control by four diffusing pans of opal 'Perspex'. The metal frame is pierced with star-shaped apertures to provide a decorative sparkle. For ceiling mounting there is the Lido 34, for three 4-ft, 40w tubes and having single-piece rectangular 040 Perspex pans.

Lumitron Ltd, 180 Shaftesbury Avenue, WC2.

### Latest Scandinavian designs

ANOTHER AREA OF EUROPE whose designs enjoy considerable influence in Britain is Scandinavia, and for those who prefer the characteristic Nordic elegance of line, a number of new filament-lamp fittings have recently been introduced by Scandia. The



Three Scandinavian designs for filament lamps featuring the use of teak: left, veneered metal cylinder; centre, 'up and down' pendant; right, double-glass pendant.

use of natural wood veneer finishes is a feature of the new designs and when allied with the cylindrical form produces a pleasing appearance. A family of such fittings is available, with a cylinder diameter of 5½ in., lengths of 10 in. or 16 in., and finished either wholly in teak veneer or in alternate vertical bands of teak and satin copper. Another design also using teak is a rise and fall pendant having opal glass bowl held in a 21½-in. diameter metal shade, which is secured at its top in a teak cone cup which grips the flexible. Another teak cord fastening arrangement is used in a slim double-glass pendant, in which the outer glass is offered in lilac or blue tints and the inner glass in opal or red.

Scandia, 14A Marylebone High Street, W1.

### Lighting with a Parisian sparkle

A NEW DECORATIVE single-lamp filament fitting from Courtney, Pope is their 'Parisienne' pendant, whose appearance

justifies the feminine gender. Its suspension rod supports a tapered lampholder cover, from which three chains carry a metal surround fitted with white concentric louvers



*Courtney, Pope's 'Parisienne' fitting having glass rosettes to provide a touch of sparkle.*

and pattern-pierced with glass rosettes. The finish is imitation brass. With a maximum diameter of 18½ in., overall height of 20 in., it uses a 200w or 300w lamp. The same firm have also recently introduced a garden light fitting, with a mushroom-shaped spun aluminium dome and inverted conical diffusing bowl supported on an aluminium tube with a spiked rod end for insertion into soft earth. Another recent development is a range of 'Colorlite' coloured-glass shades designed to fit over standard 48w, 12v spotlamps for display lighting.

*Courtney, Pope (Electrical) Ltd, Amhurst Park Works, Tottenham, N15.*

#### Keeping the colour right

ALTHOUGH BOTH COLOUR RENDERING and colour appearance of fluorescent lamps have been the subject of keen contention, criticism has become more and more muted as lamp manufacturers have effected more and more improvements, of which the latest is the Mazda 'Kolorite' lamp. At a demonstration of its potentialities presented recently at the British Colour Council's offices, this new lamp indicated, to this observer at least, that it provides the closest yet to daylight, which for many people is synonymous with white light. This result is achieved with a new combination of phosphors, arranged to give a colour appearance akin to that of noon sunlight in temperate regions, but with a slight pink tinge (hardly noticeable in comparison to natural and warm white lamps) so that the lamp should never appear green when viewed against sunlight. It is intended primarily for use in shops and stores (although whether it will diminish what is now virtually a reflex action among customers to take goods to the window or doorway for close inspection is questionable) and for the design, development or manufacture of colourful products. Available in the 5-ft, 80w rating with bayonet or bi-pin cap, and in the 4-ft, 40w rating with bi-pin cap only, the 'Kolorite' lamp has an estimated life of 5,000 hr. at average outputs of 2,560 lm and 1,360 lm respectively.

*AEI Lamp and Lighting Co Ltd, Melton Road, Leicester.*

#### Fluorescent fittings of slim design

THE TREND TO REDUCED bulk and weight in fluorescent fittings is further exemplified in the new Philips range of 'Streamlite' units for commercial and industrial use. In depth they are not much greater than the lamp itself, this having been made possible, in part, by the use of polyester-resin-filled ballasts. The new fittings are available for up to three lamps in the 5-ft, 80w size and for one or two lamps in the 2-ft and 4-ft sizes, in either switch start or starterless versions. Other features include sprung rotor lampholders giving extra lamp support, 10 amp mains terminal block and earth connection, and a variety of diffusers and reflectors.

*Philips Electrical Ltd, Century House, Shaftesbury Avenue, WC2.*

#### Circular fluorescent fitting

CARRYING A GUARANTEE for three years, and with a lamp guaranteed for one year, the 'Ringway' circular fluorescent fitting is a smart-looking unit in coloured glass and chrome. Designed for mounting direct to the ceiling, it comprises a circular plate which carries the lamp round its periphery



*The 'Ringway' fitting for circular fluorescent lamps.*

and control gear in the centre, this being then enclosed by a glass centre piece available in black, primrose yellow or red which is held in place by a chromium-plated centre bush. It is made in three diameters of 8½ in. (22w), 12 in. (30w) and 16 in. (40w), retailing at 79s. 6d., 87s. 6d. and 97s. 6d. respectively.

*Hounslow Heath Electrical Ltd, 375 Staines Road, Hounslow, Middlesex.*

#### Cantilever suspension fluorescent fitting

DESIGNED PRIMARILY for the home, but suitable also for a variety of commercial installations, the new AEI Mazda 'Netaline' fluorescent fitting is unusual in the use of cantilever construction for single point fixing direct to the ceiling with no more than two wood screws. It employs a 4-ft, 40w warm-white lamp operating on a resistance wire circuit from a 230/240v supply. Its slim, contemporary design makes it eminently suitable for modern interiors, and it is available in finishes of Starmist blue, Seville yellow or Mayfair lilac. Both lamp and fitting are covered by one year's guarantee; it is sold complete with lamp, fixing screws, wiring connector and instructions at 79s. 9d.

*AEI Lamp and Lighting Co Ltd, Melton Road, Leicester.*

#### Lighting by design

BRIGHT COLOUR is the feature of new 'Rotaflex' fittings designed by Luciano Zucchi, and which were on show to the public recently in a special exhibition of some of their fittings at the Design Centre. The new pendant fittings are clusters of three two-colour lamp shades in Rotaflex extruded plastic suspended at staggered heights. The lower half of each shade is pearl, whilst the upper half is coloured amethyst, sapphire or topaz. Other features of the display included the new 'Texoflex' range of drum and cylinder pendants and cone and cylinder table lamps in which the Rotaflex diffusers are covered with a washable fabric, and the 'Bow' range, designed by John and Sylvia Reid, of table bracket, floor standard, wall bracket and pendant units. Each unit consists of two panels which are bowed outwards, hence the name; the panels are available in teak, and in opal, red, yellow and black Rotaflex. *Rotaflex (Great Britain) Ltd, 4-10 Nile Street, Clerkenwell, N1.*



*Two views of the recent Rotaflex display at the Design Centre, showing, left, some variants of the new 'Bow' range, and right, the two-colour shades and the 'Texoflex' shades in drum, cylinder and conical shapes.*



# Fluorescent Fittings in Mass Production

PARALLELING THE CONTINUED increase in the use of fluorescent lighting is the growth of Thorn Electrical Industries' factories at Spennymoor, Co. Durham, where an expansion and modernization programme for the production of fluorescent fittings and control gear has recently been completed. The firm started at Spennymoor in 1951, with a staff there of 200 based on a nucleus of trained personnel transferred from their Enfield works. Now, more than 3,500 are employed, on domestic appliances as well as lighting equipment, whilst the last five years have seen a 300 per cent increase in fittings production and a 400 per cent increase in control gear output.

The modernization programme involves a completely new building devoted entirely to the manufacture of control gear, and a major extension built on to the fittings factory to allow space for a new machine shop and steel stores, which has enabled the assembly shop to be entirely replanned. The new choke production block, which we were privileged to see in a recent visit, makes full use of modern production techniques and exhibits particular care in the



*Above is seen a general view of the new Atlas factory block at Spennymoor for the production of fluorescent lighting chokes. Left is shown the electrostatic spray plant, in which metal chassis of fittings are automatically enamelled. Below, a view of the assembly lines for 'Kitchenlight' and 'Popular Pack' fittings.*

provision for mechanized handling and for the progression and testing of components throughout every production stage. The factory is concerned primarily with choke assembly, building up the finished product from coils, laminations, base and cover. At the start of the assembly line, pairs of inner lamination stacks with polyester-resin filling compound between them are inserted automatically into the coil. Each coil and core assembly is then placed on a jig, where its inductance is set against a standard. The units are then carried over a heating tower, which hardens the resin to fix permanently the gap between the laminations. The outer laminations are then assembled round the coil and the lead wires insulated by sleeves. This assembly is now fitted into its cover and base, for final setting of inductance, and testing for power loss, open circuit and insulation resistance to earth, using a bridge circuit testing equipment in which the unit under test is compared to a standard. To complete the construction, the chokes are varnish impregnated, labelled and given a final routine electrical test, again using a bridge circuit, but augmented by the addition of a programme unit which makes the test fully automatic.

Production of fittings is characterized by similar modern techniques and thorough testing at every production stage. Apart from 'Popular Pack' and 'Kitchenlight' fittings, other equipment being made at Spennymoor includes the 'Atlantic' series, 8-ft fittings and large fittings for Government contracts. An additional factory is being laid out to specialize in 8-ft fittings and special equipment for lighting schemes.





# IES Activities

The Society had a well-attended sessional meeting on December 13 for a paper by Mr J. M. Waldram, which was characterized by the high standard and sustained interest which members have come to expect of this author. His subject, 'Visual problems of motorways', was a sequel to a paper dealing with traffic routes presented to the APLE Conference in September.

His analysis of motorway driving showed that it is, at the first impression, much easier than driving in traffic routes. Despite much greater speeds, the driver has little to do; on the other hand, he has to maintain a constant alertness. Nearly all that the driver sees is important and he therefore has to make much less selection between what is significant and what can be discarded. Since the boundaries of the road are much further away than in traffic routes, the sensation of speed is much less. Other vehicles are seldom close and the driver tends to drive in relation to them rather than to the road, the opening and closing rates being comparatively slow.

On the other hand, a car becomes much less manoeuvrable as its speed increases and any movements in relation to other vehicles must be made slowly. It follows, therefore, that the driver needs information about other vehicles, and must give information about his own, with much more time in hand than on a traffic route. He must give much greater clearances, and will thus fixate at up to 1,000 ft ahead, rather than at 200 to 300 ft, which is the usual fixating distance on traffic routes. The most important information is the closing rate, which becomes increasingly difficult to discern as the distance between the two objects increases. It is detected by movements of the observed vehicle within the framework of the perspective of the road. Steering is also more delicate, much greater reliance being placed on the streamer effect.

Another important characteristic of motorway driving is that nothing is assumed to be stationary. A stationary object is unexpected, and can be, therefore, extremely dangerous, but it is also more difficult to detect in time to realize that the closing rate is equal to one's own speed. Another hazard is fog, particularly if it is patchy, and it is more difficult to appraise since there are so few fixed objects by which its density can be judged.

Having established the daytime visual requirements (which would also be the requirements for a lighting installation to be successful), Mr Waldram went on to examine night-time driving under the present unlighted conditions to show if there is a technical case for fixed lighting. The first fact to emerge was that vehicle headlights are quite inadequate in pro-

viding the visual information required. The useful range of the driving beam in revealing the course of the motorway by the reflector studs of the lane markings is no more than 400 ft and with the dipped beam (which is used most of the time) it is a good deal less. The first consequence is that the driver drives only by the studs and by the lights of other vehicles, but unless they can be set against a recognizable picture of the road they cannot be located and closing rates cannot be estimated. All that the driver sees are the lane lines and vehicles for a short distance ahead and beyond a cloud of red lights which it is frequently impossible to interpret. The run of the road is largely unknown and may be quite different from what is imagined; without the frame of reference of the remainder of the perspective, movements of vehicles ahead cannot be interpreted, and appear to be incomprehensible. A stationary vehicle would be most unlikely to be interpreted correctly; an unlighted obstacle would certainly not be seen in time for safe action. Closing rates of overtaking vehicles seen in the driving mirror are much more difficult to assess; the field of view is restricted and there is no frame of reference at all. Patchy fog becomes a real menace.

Despite these difficulties, it is concluded that motorway driving at night, though far more exacting than by day, is safe as long as everyone keeps to the rules. With the present traffic density, the accident rate is quite small but with the insufficient information obtained from headlights, the chances of misreading the traffic situation, and of getting into difficulty if anyone does the unexpected, are fairly high. As traffic increases, the probability of these situations developing into accidents will obviously increase.

Fixed lighting, however, is capable of revealing to a driver on a motorway all the information which is available to him in daylight, as exemplified on the French Autoroute du Sud, where drivers drive as in daylight, without headlights. Objects are visible up to the topographical range; the lanterns indicate the course of the road ahead and the existence of fog and its density. The driver is shown the perspective of the road and is able to locate other vehicles and estimate closing rates. The greatest disadvantage is the hazard of columns to a car leaving the motorway out of control, especially columns on the centre reservation. Mr Waldram went on to discuss requirements for motorway lighting in greater detail, concluding that a technical case for its installation has been made.

The ensuing discussion exhibited a large measure of support for Mr Waldram's conclusions, although Mr Grime, of the Road Research Laboratory, suggested that

it might be possible to employ lighting which was somewhat less expensive and elaborate. What came out most clearly was that the case for lighting motorways had now become so strong that there was imperative need for an experimental installation of some fifteen miles so that reliable statistics could be obtained.

## In the Centres

BIRMINGHAM had two events in November: a successful ladies' evening and an end of the month meeting with a paper by Mr H. R. Ruff on 'Production of Light Sources'. From a starting point that 'faith in the eventual usefulness of one's work is the first requirement of the experimenter', he introduced his audience to some of the complexities which face the development engineer in converting a conception into a light source capable of mass production in commercial marketing.

At his induction as chairman of the Nottingham Centre, Mr G. R. Mountford dealt in his address with lighting and electrical installation in retail stores, giving a brief historical review, and also including the 'back room' areas not normally seen by the public. He emphasized the importance of planned maintenance by pointing out that consumption costs were increased in ratio to the light output if fittings were not regularly maintained and lamps left in commission after the end of their nominal useful lives.

At their luncheon meeting in November, Glasgow Centre paid tribute to their retiring secretary, Mr A. M. Rankin (until recently with the A.E.I. Lamp and Lighting Co.), after fifteen years hard-working service in that office. The Centre, as a token of their recognition of his work, presented Mr Rankin with a watch. We join with his friends in Glasgow and in the Society in wishing him all happiness in his retirement.

## Recent Publications

THE Society's two monographs have recently been joined by the third: 'The new approach to interreflections' by R. O. Phillips and S. J. Prokhovnik. It discusses the principles involved in determining the effects of interreflections by the solution of a set of simultaneous linear equations. The method depends on determination of the flux transferred from one finite surface to any other in the room; calculation of the required 'form factors' is considered in detail. The method's application to a number of situations is indicated, giving, in general, results which agree well with measurement. Copies may be obtained from 32 Victoria Street, SW1, at 5s. (postage 6d. extra).

## Forthcoming Events

### LONDON

#### January 9

Modern aids to lighting design—Computer techniques, by H. R. Ruff, H. E. Bell-chambers and G. K. Lambert. Federation of British Industries, 21 Tothill Street, SW1, 6 p.m.

### CENTRES AND GROUPS

#### January 2

BIRMINGHAM. Display of lighting fittings. Bennett Hall, YMCA, Snow Hill, 6 p.m.

#### January 5

CARDIFF. Sports lighting, by W. G. Steward.

NOTTINGHAM. Light effect on dyes, by W. L. Lead. Electricity Centre, Carrington Street, 6 p.m.

#### January 9

SHEFFIELD. Recent developments on the Continent in exterior lighting, by A. G. Penny. Grand Hotel, Sheffield, 6.30 p.m.

#### January 11

EDINBURGH. Paper by Centre Chairman. YMCA social room, 14 South St Andrew Street, 6.15 p.m.

NEWCASTLE-UPON-TYNE. Modern films on lighting. Room B7, Percy Buildings, King's College, on Victoria Road, 6.15 p.m.

#### January 12

MANCHESTER. Chemical reaction of light on colour film, by R. B. Collins. Demonstration Theatre, NW Electricity Board, Town Hall Extension, 6 p.m.

#### January 13

BIRMINGHAM. Annual Dinner. Queen's Hotel, 7 for 7.30 p.m.

#### January 16

BATH AND BRISTOL. Lighting for people.

#### January 17

LIVERPOOL. Designed appearance lighting of Gloucester Cathedral, by J. M. Waldram. Electrical Industrial Development Centre, Merseyside and N. Wales Electricity Board, Paradise Street, 6 p.m.

NORTH LANCs. Lighting and other things in Moscow and Leningrad, by A. G. Penny.

#### January 23

LEEDS. Daylighting in public buildings, by G. Ellis Miles. British Lighting Council, 24 Aire Street, 6.15 p.m.

LEICESTER. Discussion on future lighting for night travel on the roads. Principal speakers: K. J. Jones, H. R. Ruff. Sports Club, E. Midlands Electricity Board, 6.15 p.m.

#### January 27

GLASGOW. Luncheon meeting. Bath Hotel, 12.30 p.m.

NEWCASTLE-UPON-TYNE. Annual Dinner and Dance. County Hotel.

#### January 30

BIRMINGHAM. Visual perception, by R. G. Hopkinson. Regent House, St Phillip's Place, Colmore Row, 6 p.m.

## MISCELLANY

### Book Review

'Induction-type Integrating Meters', by G. F. Shotton and G. F. Tagg. Published by Sir Isaac Pitman and Sons, London, 1960. Pp. 214, with 80 illustrations. Price 63s.

This is a detailed study of integrating meters, setting out the fruits of the intensive research which has been carried out on these instruments under the aegis of the Electrical Research Association.

Comprehensive, and yet compact, the book bids fair to become the standard reference on the subject, and is likely to become much used by design engineers and by electricity board meter testing station staffs. A large part of the book is devoted to the lower bearing and its problems, being a record of the ERA's research on this aspect; other sections set out the theory of the meter's action and the nature and elavuation of parasitic forces, whilst one chapter is devoted to discussing a suggested figure of merit by which meters may be classified. Concluding chapters deal with the jewel cleaning and polishing, and with means of protecting jewels and pivots against damage by mechanical shock.

L. L.

### Personal

THE NEW Chairman of GEC, succeeding Sir Leslie Gamage on his retirement at the end of the year, is MR ARNOLD LINDLEY, previously vice-chairman and managing director. He continues in the latter position in addition to his new post. His service with the GEC began in 1918, in an engineering apprenticeship at Erith, from which his outstanding engineering abilities took him to the position of Chief Engineer of the South African GEC in 1932, and later to that firm's assistant general manager, and to a directorship of the East Rand Engineering Co. He returned to Britain in 1949 to take up the post of general manager of the firm's heavy mechanical engineering works at Erith, became a director in 1953 and was largely responsible for GEC's entry into the nuclear power generation field. A.E.I. Lamp and Lighting Co. have appointed Mr A. B. FROST the assistant manager of their Midland sales region. Previously he had been assistant to the regional manager, and Northampton area manager.

### Obituary

#### Mr Alexander Kelso

WE REGRET to announce the death on November 28, at the age of 62, of Mr

Alexander Kelso, manager of the Glasgow area, South of Scotland Electricity Board. He started his career in the Fife Electric Power Co., and then moved to Harrogate, where from 1939 to 1948 he was borough electrical engineer and manager. He was for many years active in the Leeds Centre of the IES, having served as chairman, and he continued his interest in the lighting industry on moving to Glasgow.

### Overseas News

A NEW PHOTOEMISSIVE MATERIAL suitable for operation at temperatures up to 250°F is reported by the electronic tube division of Westinghouse. In contrast with generally used materials having caesium as the major constituent, this new compound is a bi-alkali, made by combining sodium and antimony with potassium. Applied as a semi-transparent surface over a glass substrate, the material exhibits photoresponse values up to 80  $\mu$ A/lm, with a response uniform within 10 per cent over the useful cathode area. When continuously illuminated and subjected to thermal ageing at up to 250°F and over periods of up to 140 hours, decline in photoemission is exponential after an initial 10 hour ageing period. Another useful feature is that the dark current is less than 1 per cent of that for conventional materials.

NEW PRESIDENT OF CANADA'S National Committee on Illumination is Dr G. W. Wyszecki, who is head of the radiation optics section in the Applied Physics Division of the National Research Council of Canada. The new secretary of the committee is Dr C. L. Sanders, also of the NRC's Applied Physics Division.

'STREETS—LIGHT—SAFETY' was the theme of a conference organized in Germany in November 1959 by Lichttechnische Gesellschaft, the German lighting society. A full account of the proceedings of that conference has recently been published and provides a useful up-to-date review of continental practice and ideas. The report is in three main sections, dealing with the purpose of street lighting, aspects of the design of street lighting installations and problems in the administration of street lighting. There are also specialist sections on road building and lighting, bridges and elevated roads and tunnels and underpasses.

The report is published by Helios-Verlag GMBH, Berlin-Borsigwalde.

### Industrial Notes

LIGHTING PROMOTION LITERATURE available from the British Lighting Council has recently been augmented by four new leaflets designed for point-of-sale display and for use by retailers' and electricity boards' staffs

for distribution to users. Two leaflets deal with factory lighting (one on exteriors, the other interiors), whilst the other two are concerned with home lighting and office lighting. *Light Up and See*, the leaflet dealing with exterior industrial lighting, gives a number of illustrations of good installations, and describes briefly the advantages such lighting brings, whilst its companion *Facts for Factories* provides some factual and other evidence of the improvements in industrial efficiency to be obtained by good lighting. *Seeing About Your Office* also provides indication of the values of good lighting and gives a list of items for users to check to determine for themselves whether the lighting is as good as it ought to be. *Seeing About Your Home* is a concise reminder to the householder of the virtues of proper home lighting and includes a tear-off strip to be returned to the supplier indicating problems the householder would like to discuss. The leaflets can be obtained from the Council, Brettenham House, 16-18 Lancaster Place, London, WC2, at the following prices per 100 and per 1,000 respectively: *Light Up and See*, *Facts for Factories*, 25s. 6d., £12; *Seeing About Your Office*, 18s. 6d., £9; *Seeing About Your Home*, 12s., £6.

NEW ADDRESS for the Atlas London Area Order office is Angel Works, Angel Road, Edmonton, London N18 (Tel: EDM 3050).

THE NEW FACTORY at Potters Bar of SLR Electric Ltd is now in operation for the manufacture of fittings for both filament and fluorescent lamps and of special trunking, ducting and similar equipment. Assembly, dispatch and general sales departments continue to operate from their existing South Harrow premises at Welbeck Road.

LIGHTING ON CREDIT is a new service now being offered by the GEC. It is being provided by them in conjunction with Forward Trust Ltd, a subsidiary of Midland Bank, and will enable commercial and industrial firms to buy lighting and heating installation on extended credit terms. Although the scheme is being operated initially only by the GEC's Lighting and Heating, Installation Equipment and Osram groups, it is planned to extend it eventually to other groups in the organization. Under the plan, the cost of a heating and/or lighting installation, including wiring, installation and servicing, can be spread over any period from six months to two years, or longer, with initial payments down to as little as 10 per cent of the total cost. Interest charges are said to be competitive (5½ per cent per annum for £1,000) and are, of course, deductible for tax purposes. The scheme enables the firm to offer a complete 'packaged' deal, providing for equipment specially made to the customer's require-

ments; wiring may be carried out by the GEC's contracting department or by the firm's own electrical contractor.

REDUCED PRICES for fluorescent fittings attachments were announced recently by Atlas and Ekco-Ensign. The attachments affected are the kw series diffusers used with their super slim 'Popular Pack' fittings. The reductions range from 25 per cent (in the list price) for the 8-ft diffuser to 17 per cent for the 2-ft size.

## Situations

### Vacant

LIGHTING ENGINEER required for Manchester Office of leading lighting manufacturers. Preference given to holder C. & G. Inter III. Eng. Progressive appointment. Pension Scheme and Life Assurance Scheme. Write, giving full details, previous experience and salary required to Box No. 719.

CROMPTON PARKINSON LIMITED require for London area a man with successful sales record of industrial and commercial lighting. Age envisaged between 25 and 30 years. Technical knowledge may be an asset but sales ability is paramount. Reply with initial detail to Ref. S3V, Crompton House, Aldwych, London, WC2.

## TECHNICAL OFFICER

A **Lighting Engineer** is required to organize a daylight service for the building industry. He will give practical and scientific assistance on the use of daylight in buildings and will be backed by a full experimental service including model studies under an artificial sky. He will also be responsible for maintaining liaison with professional institutions, assisting with the production of technical literature and lecturing on daylight. An interest in and knowledge of architectural design and building environment in general is required and some experience in this field would be an additional qualification.

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# Postscript

A WARM WELCOME TO 1961 for all my readers. 1960 was a year of steady progress in the lighting world, even if no outstanding development was announced. Should anyone ask me to name what might later be seen to be the lighting industry's highlight of the year, I think I would suggest the APLE conference at Folkestone, when British street lighting seemed to give itself a good shake up and get ready to forge ahead into the lead once more as in the 1930s. We heard at the IES Jubilee why our system of street lighting needs some revision—the duller surfaces of non-skid road dressings are perhaps the most important of the changes that have occurred since pre-war—and it was clear from what was said at Folkestone that we should expect this revision soon. Certainly to the layman British street lighting looks quite different from pre-war, but it is mostly in matters of 'styling' rather than in the basic principles. Fortunately the investigators who put us ahead before are still active, ready to blend their experience with the ideas of the innovators who would see more of the Continental ideas applied over here. Lighting engineers can do a great deal to reduce the number of road accidents at night.

THE PAST MONTHS of night driving have brought home to us the price we pay in winter in these northern latitudes for our few weeks of long summer evenings. It is a heavy price, but I for one would not change, and the delight expressed by our summer visitors from lower latitudes suggests that they too feel that we have the best bargain. It comes as a shock when we ourselves go to the USA, for example, to find daylight shutting off in the early evening in the height of summer, with everyone scuttling indoors behind the 'bug screens' to avoid the attacks of voracious insects whose energy and persistence puts our feeble gnats to shame. But when it comes to our winter, with long hours of night driving, we realize why our street lighting has to be so good. But I am constantly puzzled why the authorities still decline to introduce a night vision test, or even just a declaration comparable with the 25-yard number-plate check on daytime vision. Many people whose vision is quite satisfactory in daytime suffer visual defects at night which make them unsafe on the roads. Reduced visual acuity usually, but not always, makes itself known, but peripheral night blindness can creep unawares on a man without affecting his forward vision. Such a person may be able to see ahead as well as ever he did, and yet be quite blind at night to cyclists and pedestrians to the side of him. This is the more dangerous condition. Defective night vision need not prevent a driver from using his car by day in good light. Is it an unfair restriction on liberty to restrain a driver with poor night vision from using his car at night?

SCIENTIFIC EXHIBITIONS NOWADAYS are often mere displays of electronic virtuosity, of interest only to the bespectacled young men who either design the instruments or buy them for their firms. The Industrial Photography Exhibition has its share of electronic wonders, but there still remains much of interest for those whose preference is for neat mechanical or optical design. The latest of these exhibitions, held towards the end of last year, showed above all how automation is sup-

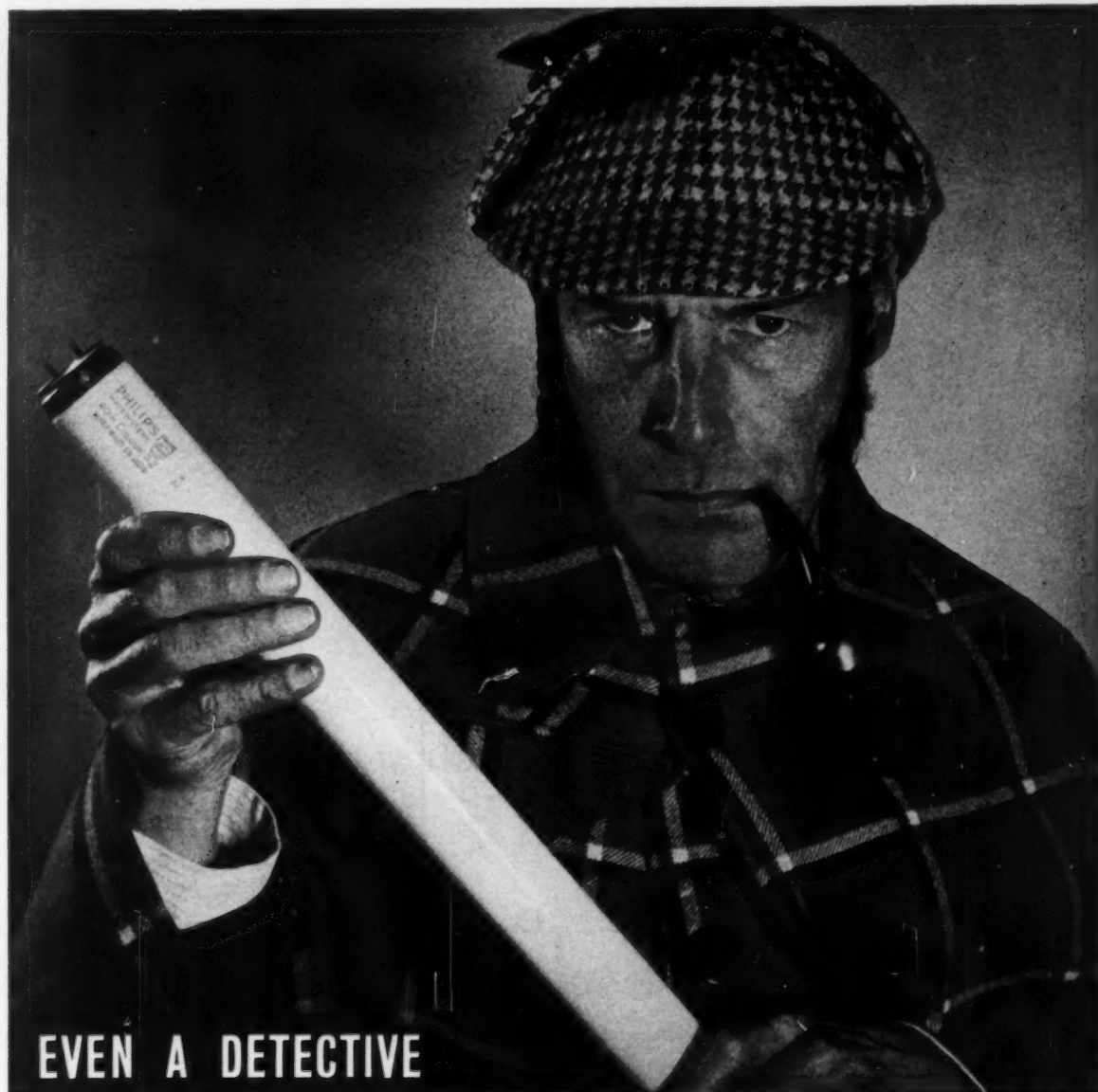
planting personal skill in the routine production of your snapshot pictures, whether black-and-white or colour. The best work, however, still demands the professional knowledge of the old hand. One item of some interest was the Polaroid Land camera, for long available only in America, which permits a photograph to be taken in a glimmer of light and a satisfactory transparency to be produced in the camera itself, ready for projection, in less time than it takes to boil an egg. A demonstration of colour television showed up rather poorly in the company of some of the best colour photography by the best photographers in industry.

PROFESSOR YVES LE GRAND, who is well known to most readers, writes, in the March 1960 issue of our contemporary *Lux*, about the physiological and anatomical side of vision, and brings together in an excellent paper many facts which would otherwise demand a careful search through the literature. He refers to the effects of age on vision. Elderly people suffer from a number of progressive changes in their vision which together render it absolutely necessary that they should be given good lighting if they are to see to work well. They cannot focus so well or so quickly, their pupils contract so that less light gets to the retina, which itself may degenerate so that resolution of detail deteriorates even if the lens is still good, and the range of the spectrum which they can register is reduced because the lens becomes yellow with age. It is not generally known, however, that these changes start very early in life. For example, the loss of the ability to focus near objects may even begin at birth, because the artery which feeds the lens then disappears, the lens living on in a 'closed economy' which, says Professor Le Grand, is as bad for the human organs as it is for nations. It may surprise my younger readers to know that they suffer from presbyopia, but they do, even though they may not be aware of it until they reach the age of 45 or thereabouts. All these various effects, being cumulative and progressive, make a strong argument for special lighting treatment for the elderly. They have been said before, of course, by Weston over here and by Fortuin in Holland, but Le Grand says it again and very well too.

CONVERSATION TURNED THE OTHER DAY to the future of lighting as a profession. A professor of electrical engineering deplored the fact that none of his top men contemplated going into lighting. A similar story comes from the Colleges of Advanced Technology—so few people taking lighting courses, especially at advanced levels, that the cost of the courses can hardly be justified. None of us could recall any recent paper of outstanding original merit by a young engineer in his twenties. Good follow-ups of others' work are all very well, but this does not make for real progress. There is clearly a need for some smart promotion work to be done in the schools of engineering if the lighting profession is to avoid stagnation and decay or becoming a mere offshoot of architecture or internal decoration. Lighting can and does offer real interest and reward. It is a small but satisfying field, and a man, once in, rarely leaves it even for financial inducements.

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- 5 Fully closed anode ring (80W 5 ft.) reduces end-blackening and extend electrode life.



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## Horstmann— the automatic choice for lighting control

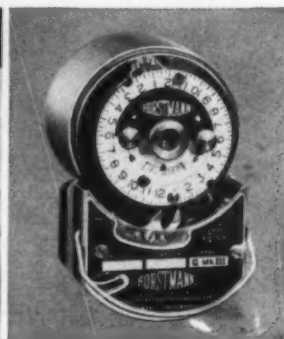
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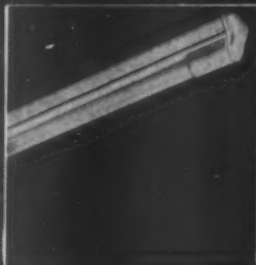
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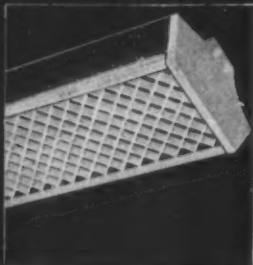
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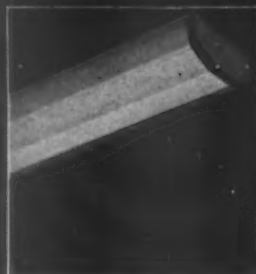


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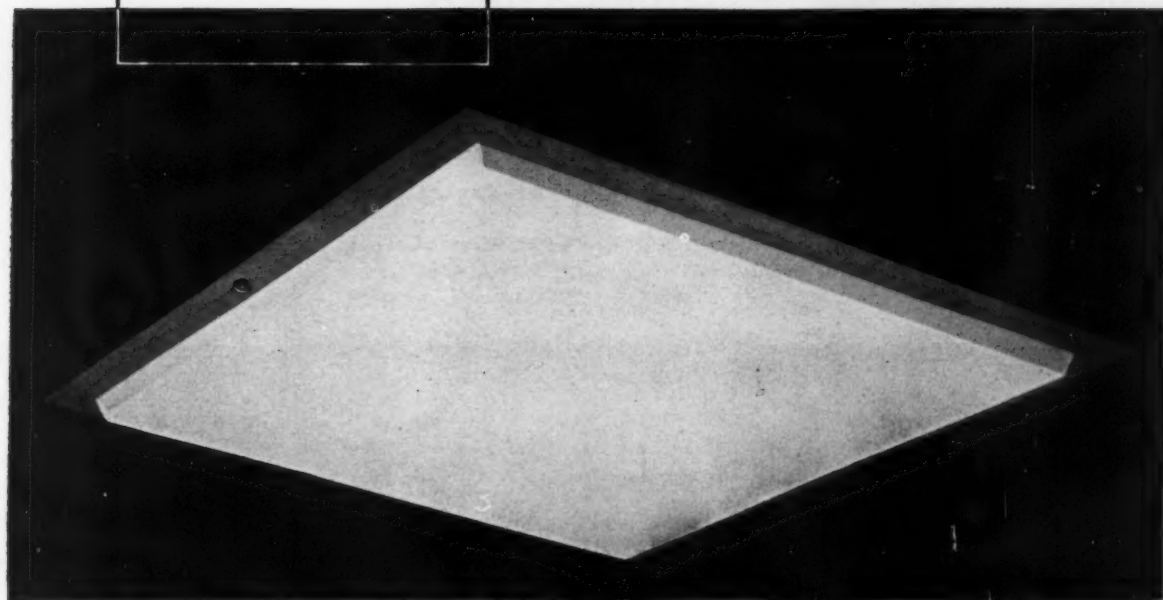
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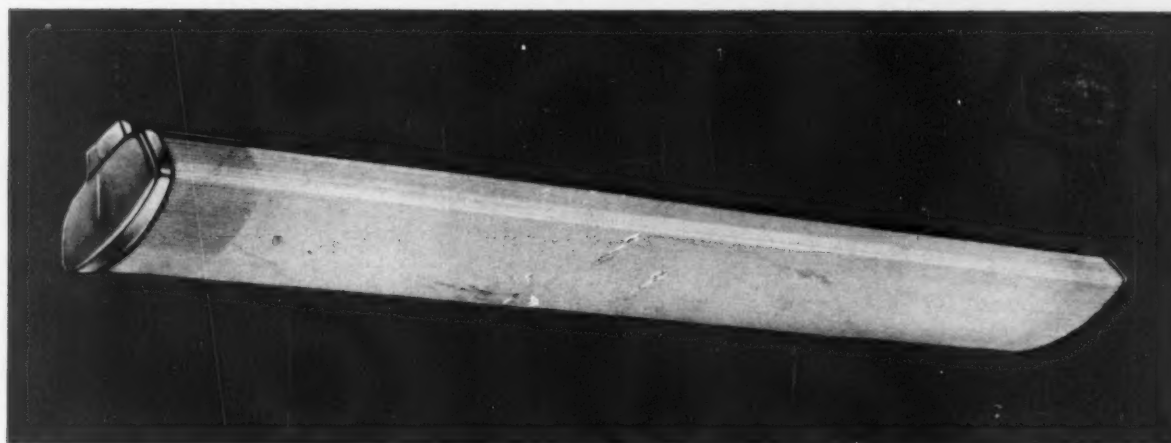
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